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Blu-ray -482 Dolby Rtnos *** Dolby Rtnos ** Dolby Rtnos *** Dolby Rtnos ** Dolby Rtnos *** Dolby Rtnos

NINJA TURTLES ON THE ROOF!

Dolby Atmos comes to Blu-ray — we say 'Cowabunga'!

MASSIVE MULTIROOM TEST INSIDE!

Bluesound Bose SoundTouch Definitive Technology HEOS by Denon LG Music Flow Panasonic AllPlay Pure Jongo and Sonos

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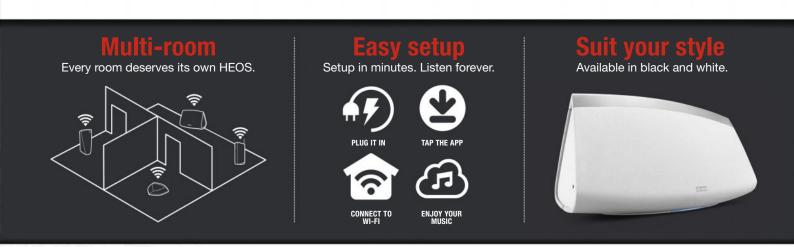
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SOUND

VOL. 28#03 APRIL-MAY 2015













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Our new Sound+Image Buying Guide brings together all our award-winners in an ongoing set of recommendations. This issue: Speakers, PVRs, Headphones, DACs, Amplifiers, Soundbars and Wireless Loudspeakers. It starts on p92.





The Habit of Streaming

t's been a big month for streaming in Australia. We now have Netflix finally available, the TV and movie service that absolutely dominates the US market, while in music we have seen (and heard) the launch of two music streaming services, Deezer Elite and Tidal, which deliver not the usual 320k streams but actual full CD quality.

All are exciting advances, though each came with a potentially joy-quashing caveat. Netflix, while addictively wonderful, turns out to have a whole lot less in its catalogue than offered by the US Netflix which is widely accessed here via VPN (some estimate as many as 200,000 US Netflix users here). To be fair, Netflix did warn everyone about that in advance, and asked not to be judged purely on its initial offering. We are certainly impressed by its pricing, which starts (for one SD stream) at just \$8.99 a month, or \$11.99 for two HD streams.

There's no such caveat on the catalogue or quality of Deezer Elite and Tidal. Deezer Elite streams as lossless FLAC, 'unzipping', as it were, to a full CD-quality 16-bit 44.1kHz, and offering what we believe to be the largest online library currently available, at around 35 million songs (Spotify claims around 30m, Tidal 25m). But Deezer's decision to give Sonos users a near-exclusive for the first 12 months is sure to benefit the take-up of Tidal here. (You can use Deezer Elite on a computer browser, but delivery via any other device will drop back to a 320k stream.)

So all looking and sounding good now, but how much do you want to spend on streaming media? The price for the CD-quality music streams seems high — a full doubling of price over their 320k streams, both music services asking \$23.99 a month. (Deezer Elite offers half price by paying for a year in advance, but only for the first year — after that, it's back to \$23.99 a month.)

Why so much more for CD-quality? With Tidal now promoting itself as "artist-owned", you'd think those artists would encourage users to listen at the best quality. I gather the record companies charge far more to allow the higher quality streams, so it may be they who are ultimately behind this hike. Quelle surprise.

We should, of course, compare prices here with that terribly old-fashioned way of accessing music and movies — buying them. How much do you currently spend on music a month? How much on movies? And would you *stop* buying them if you had streaming? I've been paying for music streaming on and off for several years, and it hasn't cut down the amount of music I buy at all! Indeed, I've been buying LPs far more in the last two years than since

the late 1980s, and given the six expensive Led Zeppelin box-sets I've snuck past the missus into the house over the last year, I fear my expenditure on hard-copy music has risen, not declined.

There's another thing to consider before investing in streaming — your internet connection and your home network. One of our own team invested in a streaming music system after our huge multiroom test this issue, and although they live in an only mildly outlying Sydney suburb, Optus delivers them a deeply unimpressive broadband speed below 2Mbps. As a consequence they had jitters streaming Deezer at 320k let alone CD quality, and even the control app took unacceptably long just to load album artwork. Frankly, until that broadband speed is fixed, the whole project is a non-starter. Video streaming is clearly out of the question in such an environment.

So there's more to consider than the simple switch of expenditure from buying to renting. There are the technical issues. The question most asked of me in the last month is 'How do I get Netflix onto my telly?' The answers seem many and easy enough to me — smart TV or PVR, console, AppleTV, throw to Chromecast, laptop with HDMI etc. But these seem insurmountably technical to some.

Most of all, though, it may be the simple habit of streaming we need to develop. I have, at present, a Deezer Elite subscription (running courtesy of Deezer, so I could test it). But whenever I sit down to play music, I still tend to go to my iTunes collection, to my high-res albums on a NAS drive or, if enjoying an extended moment of musical relaxation, to my vinyl. I often forget I have that whole world of music behind the browser. This is a mindset thing, for sure - when http://research.culturalequity.org recently put up some 17,400 files of Alan Lomax recordings, I spent a chunk of one Sunday morning working out if I could somehow download them all to keep, even though I'm assured they will be up there, streaming and free forever, without the need for me to use storage and back-up space to have them in the house. Despite the endless music now available to stream, I still like to own stuff. This collector mentality must be abandoned if you want the best value out of streaming. Otherwise you're doomed to additional rather than alternative expenditure.

Still, not complaining; I'm pleased to have the choice. As for access to 35 million songs at CD quality, and the Netflix catalogue at $\mathrm{HD}-\mathrm{I}$ think streaming will become a habit pretty darned fast.

Cheers,

Jez Ford, Editor.

www.twitter.com/avhuboz



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sound.image@nextmedia.com.au

Editor Jez Ford jford@nextmedia.com.au

Art Director Kristian Hagen

Art & Design David Chew

Contributing Editor Greg Borrowman

Contributors: Greg Borrowman, Stephen Dawson, Jez Ford, Edgar Kramer, Derek Powell

Advertising Sales Manager Lewis Preece

Advertising Traffic
Di Preece dpreece@nextmedia.com.au

Divisional Manager & National Advertising Sales Manager Jim Preece jpreece@nextmedia.com.au Production Manager Peter Ryman Circulation Director Carole Jones

Sound+Image Subscriptions

1300 361 146 or +61 2 9901 6111 Locked Bag 3355, St Leonards NSW 1590 Subscribe online: www.avhub.com.au

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nextmedia

Locked Bag 5555, St Leonards, NSW 1590 Ph: 02 9901 6100 Fax: 02 9901 6198 www.nextmedia.com.au

Chief Executive Officer David Gardiner **Commercial Director** Bruce Duncan

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NEW-TECH'15

INCORPORATING THE AUSTRALIAN AUDIO & AV SHOW 2015

Occupying the new Hall 5 at the Sydney Show Ground Exhibition Centre, NEW-TECH is a new show featuring interactive exhibits, high-end audio sound lounges, home cinema demonstrations, amd wider technologies including digital photo imaging, satellite navigation, mobile/in-car entertainment, eco-friendly & leisure technologies.

eco-friendly & leisure technologies.

The NEW-TECH show is aimed at all the family and for all ages, and is organised by The Chester Group. It also incorporates the Australian Audio & AV Show, which our regular readers will know well. This year's NEW-TECH will bring the best of that show together with wider areas of technology and a more interactive experience.

NextMedia is media partner to the event, and we will be providing more details of exhibitors, events and more in the lead-up to the show.

More info: www.chestergroup.org

DELAY FOR 4K?

A new patent-licensing group called HEVC Advance has been set up as "an independent licensing administrator company formed to lead the development, administration and management of a new HEVC/H.265 Patent Pool for licensing HEVC/H.265 essential patents". HEVC has been seen as an essential codec for streaming 4K, and also appears in the proposed spec for 4K Blu-ray players. The widespread surprise at this licensing group's sudden appearance and the fact that its 'pool' won't launch until Q3-2015 may serve to slow plans for 4K streaming and replay "before Christmas". Our money is now on 4K Blu-ray players not hitting the market until mid-2016.

DOLBY ATMOS ON YOUR HEADPHONES?

"Put on any headphones or earbuds, and experience Dolby Atmos sound on your mobile device... hear how sounds flow around you from every direction, just as in real life, with real impact..." So say the words accompanying a video at the URL below, promoting Dolby Atmos for your mobile. Really? We're already converts to the overheard speaker implementation of Dolby Atmos (see p81), and certainly one of its great merits is how an Atmos soundtrack can be scaled to any size of system available, right down to mono. But for headphones? The video on the Dolby site is loaded with action above. which is a doddle on headphones where things tend to image around the headband anyway. But flowing from every direction, just as in real life? It's sad to see such nonsense from the innovative folks at Dolby Inc. Try it for yourself at: http://www.dolby.com/us/e technologies/dolby-atmos/mobile.html

DIGITAL RADIO FIGURES UP!

The latest digital radio listening figures show an increase in weekly listeners from 3 million in the Nov 2014 GfK figures released by Commercial Radio Australia, to 3.2 million in Feb 2015. released todaygranted if manufacturers agree

Q ACOUSTICS UP TO 3000

Q Acoustics has launched a '3000 Series', the range consisting of five new designs – the 3010 and 3020 'bookshelf' models, the floorstanding 3050 model, a 3070S active subwoofer, and a dedicated 3090C home cinema 'centre-channel' speaker.

The company's 2000i Series has enjoyed great success, with accolades including our own Sound+Image Awards for the 2000i 5.1 cinema pack, and for the Concept 20s in our more recent awards. Greg Borrowman wrote in *Australian Hi-Fi* that he'd not heard "a pair of speakers at the same price that sound anywhere near as good".

The new 3000 Series benefits from numerous advanced cabinet features taken from the 'Concept' models, including ultra-low resonance cabinets. The new 3000 Series tweeter is a revolutionary '2 in1' Concentric Ring Dome design, mounted into a butyl-rubber resonance-cancelling housing. The bass/midrange drivers use a cone material mix of paper/aramid fibres.

The 3000 Series will be available in traditional 'Matt Graphite' and 'American Walnut' finishes, also in premium 'Lacquered Gloss Black', 'Lacquered Gloss White' and 'Leather effect' finishes. Prices start at \$449 for graphite/walnut 3010s; the complete cinema pack below in gloss white is \$2749. More info: www.westan.com.au



ARCAM SOUNDBAR & SUB

Arcam has released a full-featured 'Solo' soundbar that can be used as a Bluetooth streamer and also wirelessly connects to a matching subwoofer

The aluminium chassis of the Arcam Solo Bar contains a total of 100W of onboard amplification for its six drivers — twin 25mm tweeters and four four-inch bass/midrange drivers. The tweeters are angled five degrees to create a greater dispersion of high frequencies into the

room. System connections include four CEC-enabled 4K pass-through HDMI terminals, as well as digital coaxial and optical inputs and analogue 3.5mm line inputs. Apt-X Bluetooth is also onboard, and the Solo bar can be controlled from any iOS or Android device using Arcam's free Solo control app. The Solo Soundbar sells here for \$1799, the optional Solo Subwoofer for \$1099. More: www.arcam.com.au



NEWS



LG 2015 RANGE

LG's Home Entertainment launch for 2015 revealed no new OLEDs for Australia yet, but oodles of 4K and a new emphasis on audio.

The company's 4K sets now comprise two-thirds of its available models, topped by the UF950T range in 55, 65 and 79-inch sizes, then the UF850T range in 49, 55, 60 and 65-inch sizes, the UF770T in seven sizes from 43 to 79 inches, and the UG870/880T in 55, 65 and 79-inch sizes. These feature LG's new six-step upscaling to 4K, and also a 'ColourPrime' colour gamut, which extends some 20% outside the gamut delivered by either broadcast or Blu-ray (so one has to wonder from where these new colours will come from). The company's TV control system, webOS, now moves to version 2.0. All these smart TVs include direct access to Netflix.

No announcement yet of 4K OLED for Australia; Marketing Manager Grant Vanderberg explained that the demand for 4K OLED in its launch markets has been so strong that Australia has been "asked to hold off" for a while. So the 55EC930T remains the only model available here — good job it's such a superb TV! (See our full review on AVHub.com.au.)

The Music Play range (see p44) gets a significant expansion, with a new portable speaker unit and three soundbars added to the range. The current H7, H5 and H3 will be joined by a portable H4 at \$279, which can receive via Bluetooth when outside the home network or Wi-Fi when at home. Two H4s can be used as entirely wire-free surround speakers when paired with one of the Music Play soundbars. There is also a new 'Motion Play' facility, which will use low-power Bluetooth to identify which room you're in and stream music only to the nearest speaker.

More info. www.lg.com.au

RUARK TO SHARE

Ruark Audio has brought multiroom to its R2 mk3 compact music system, which delivers a versatile mix of traditional radio (DAB+/FM), internet radio, Bluetooth streaming (with aptX available), network streaming via Wi-Fi, and Spotify Connect. The multiroom upgrade allows the same music to be played simultaneously through multiple R2s, controllable from the company's top-mounted RotoDial controller, and soon from an app for iOS and Android devices. All current R2 mk3 owners will be able to upgrade via an online firmware update. The RRP of the R2 is \$799.



40 YEARS OF ACOUSTIC DESIGN

40 years of know-how have been packed into the exciting Music for You (M4U) series of high performance headphones. Fold 'em up into the protective travel case and you'll never be far from true hi-fi listening. There's even a thoughtful touch of dual input connections on either side of the headphones meaning no more crossed wires.

Have a listen to hear why the M4U2s have taken home all these accolades.















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KRIX & THE 'SX' FACTOR

Busy times for Krix in South Australia as the company launches MkII versions of its flagship Neuphonix (left) and Epicentrix centre speakers, and also a new 'SX' series of home cinema speakers.

SX is short for 'Scaled-down Extreme', being smaller versions of the company's ever-so-impressive Series X, which brings the company's commercial cinema expertise to the home. The Series SX range uses highly efficient drivers with waveguide technology to deliver high amounts of power with controlled dispersion, resulting in a dynamic soundstage bursting with both impact and clarity (we can vouch for this, having been treated to a demo in the new SX Atmos theatre at Krix HQ in Hackham, SA).

The Series SX range can be placed on or in a wall, or behind an acoustically transparent screen, with four on-wall models, two in-wall and one in-room speaker (right), supported by a choice of either the active or passive variant of the substantial Cyclonix subwoofer. Pricing ranges from \$1245 to \$1500 for each speaker, \$2895 or \$3995 for the Cyclonix sub (passive/active).

And there's more - following the success of the recent 40th Anniversary limited edition version of the Neuphonix, the team at Krix have updated the current model with some of the technology incorporated in the Anniversary model. Updates include a more compact cabinet, larger magnets for the bass drivers, a scalloped-edge grille, higher grade terminals, and an updated crossover. The matching centre channel speaker, the Epicentrix, will also be updated to match the performance of the Neuphonix Mk2. The new speakers should be available from mid-April.

Our visit to Krix HQ included a enjoyably extended interview with the company's founder Scott Krix, which we'll feature in an upcoming issue of Sound+Image.

For more info on both new releases: www.krix.com.au



Streaming and SACD/CD playback makes this the only source you'll ever need.





Arcam's CDS27 - SACD/CD/Network Streaming Player offers outstanding performance from all forms of compatible audio media. Music from SACDs, CDs and your network are delivered with outstanding quality to the very highest standards currently available. Using Arcam's unique and hard won engineering expertise, the CDS27 delivers a truly exceptional performance, regardless of the media used.



MCINTOSH MC75 RE-GLOWS

McIntosh has re-introduced its famous MC75 mono amplifier, still sporting KT-88 valves. It's been out of manufacture for a mere 45 years, so the reintroduced MC75 has been given upgraded componentry to cater for the needs of the 21st century, notably a neater set of connections, with the original octal multiway output socket and screw terminals replaced by modern binding posts, while the input to each monoblock can now be delivered via unbalanced RCA phono or balanced XLR sockets. Line-level loop outputs are also now available. Circuit-wise the MC75 uses McIntosh's patented Unity Coupled Circuit design to provide low distortion (rated at less than 0.5%), extended frequency response (specified 3dB down-points of 10Hz and 100kHz) and long valve life, while the large power transformer assists delivery of an unusually high 75-watt power output from the single pair of KT-88 output valves. Because of the use of an autoformer, power will remain almost constant whether the driving 2Ω , 4Ω or 8Ω loads. Interestingly the MC75 cannot be sold in Europe because of





PHILIPS BACK IN SPECIALISTS

Philips consumer televisions are officially back in Australia's specialist AV retailers, following the appointment of Westan as an importer and distributor. Westan's Michael Carvosso confirms to Sound+Image that its focus is on the AV specialist retail sector, and also in B2B channels such as hospitality, pubs and clubs and aged care. Westan will be distributing models from 32" to 65" across three ranges, including Smart TV and UHD (4K) models; one example already available is the 58-inch 58PUT8509 4K LED TV (above), which has an RRP of \$2699 and will be offered with a three-year in-home warranty.

Philips TVs are produced by TP Vision, now fully owned by China's TPV. Tempo Australia already distributes some models through Harvey Norman and Myer, while Avico Electronics supplies Philips panels for the hotel industry. Westan's distribution should make it far easier for consumers to access the TVs. www.philips.com.au





Welcome to a new world of sound

ELAC's brand new Line 70 is designed to inspire – on many different levels. The tradition of technology at ELAC is your guarantee of first-class workmanship and reliability. We include proprietary technology from years of experience, which results in the finest listening experience possible. The Line 70 excites with its beautiful matte satin finish, and pleasing dimensions that complement rather than dominate. With no superfluous details. Here, simplicity means clarity. In the best sense.













THE HI-FI HEADLINES



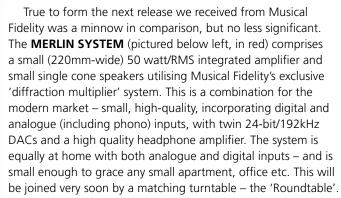
ANTONY MICHAELSON of

Musical Fidelity must be the most versatile designer in this industry. His output is legendary; as soon as he brings a new product to market he is off on another tangent. Despite his prodigious output it is very rare that he ever misjudges the market, over the years he has produced some classic products.

Antony's latest two offerings are a great example.

The recently released **NU-VISTA 800** showcases Antony at his best. This is a channel amplifier, featuring both solid state and 'nuvista' valve technology. It is rated at 300 watts/channel into 8 ohms, and an astounding 2.17kW into 1 ohm. This is a superb piece of engineering, of Hi-Fi News to conclude his just say I'm lost for words..."

monster of an integrated two one that prompted Paul Miller recent review with "Then let's



We have also just received the **PEACHTREE** NOVA220SE INTEGRATED AMPLIFIER. Peachtree was a pioneer in crossing the analogue/digital divide, and still do it better than most. The nova220SE is the most powerful amplifier that they have manufactured to date - rated at 220watts/channel into 8 ohms. Like all their amplifiers the 220 features a valve buffer stage in the pre-amplifier, high quality DACs and a high performance headphone amplifier. Possibly the most impressive thing about this amplifier is the price - it sells for \$2,849. This is excellent value.







On the subject of value Oppo have just released a PORTABLE HEADPHONE **DAC/AMPLIFIER - THE** HA-2 – which sells for \$449. Portable headphone amps and/or DACs are the buzz of the moment, with offerings as low as the AudioQuest Dragonfly 1.2 DAC (\$199 one of the industry bargains) up to the amazing Chord Hugo (which even at \$2,800 could still be considered

something of a bargain). However the Oppo is a stand-out. Typical Oppo build, and classic Oppo value, this is an exceptional buy for anyone seeking the best from their music-on-the-go.

Is there a down-side? Yes there is, Oppo have obviously underestimated the popularity of this unit and the first shipments sold out immediately, so we may have some delays in supply.

Oppo have also released a matching headphone the PM-3. Despite the lower price (\$549) the PM-3s still utilise Oppo's planar magnetic technology from their more expensive models. The drive unit is a very light diaphragm, its entire surface evenly driven, the piston-like action resulting in phase coherence and high resolution performance with very little distortion.

FINDING THE RIGHT SYSTEM FOR YOU

Bluesound **vs** Bose **vs** Definitive Technology **vs** HEOS by Denon **vs** LG MusicPlay **vs** Panasonic AllPlay **vs** Pure Jongo **vs** Sonos



Wireless Multiroom

Music, music everywhere — streaming services, app control. But which of the new or established wireless multiroom systems delivers the best combo of kit, services, ease of use and, of course, sound quality?

he arena of multiroom audio has for a decade been dominated by one company -Sonos. It was not the first company to have a multiroom system, nor a wireless system, but it combined these ideas and, crucially, spotted early that the future would be controlled by smartphone apps. Add in a dedicated 'mesh' wireless system that overcame the problems of home networks, plus a selection of attractive products that sounded good for their time, and the Sonos system achieved wide appeal and great success. Now there is competition - and serious competition. Sonos was

group test

wireless multiroom

"Remember the technical requirements good broadband and a reliable home network are absolute essentials..."

never a hi-fi brand, so there has been great hope for the new systems arriving from longserving audio companies like Denon with HEOS, Definitive Technology, Lenbrook (NAD and PSB) with Bluesound, and Bose, bringing its SoundTouch platform to many of its existing products and some new ones. Meanwhile major players like LG and Panasonic have seen the opportunities and created their own wireless multiroomcapable systems.

Given there is not much interoperability between the different systems, potential purchasers need to make the right choice early. One of the great things about wireless multiroom is that you can start small and add more rooms and products as funds dictate. But that first choice will govern your system for years to come, and it's mighty hard to judge a whole ecosystem until you've lived with it, got to grips with the control system, discovered its foibles, heard its sound quality.

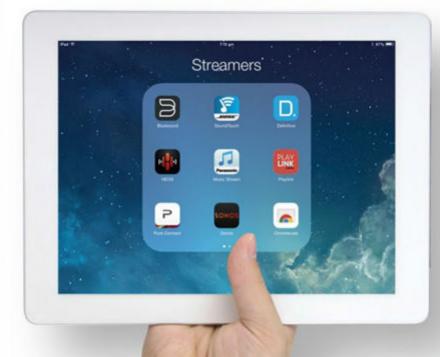
A tablet full of multiroom apps — each system has its own app, and they vary from superslick to surprisingly rudimentary... So we've been doing that for you. We should thank most of the distributors of these products for supplying multiple units over sometimes extended time periods so we could experiment within a system and compare with others. Given the multiple units in each system, this is one of the longest and most complicated group tests ever undertaken at *Sound+Image*.

Get with the stream

There are two sides to most of these systems — network streaming of files you own, and internet streaming of services from the cloud. And on the whole, most of them positively encourage you to the latter — sign up for this, log on to that, a whole world of music at your fingertips. This can be wonderful, but remember the technical requirements — good broadband and a reliable home network are absolute essentials, and make sure your plan has plenty of data headroom if you're making a wholesale switch to life in the cloud.

Impressive quality

The good news is that nearly all of these systems proved to be of high quality. Companies have put their best people and their newest tech into this sector which many companies are hoping will prove the big audio success story of the next few years. Not that we didn't encounter some quirks along the way, but many of those relate to the apps, which can be (hopefully) fixed over time.



What we're looking for in our wireless multiroom reviews...

SOUND QUALITY

However beautiful and versatile the app for a multiroom system, it's of little use if not backed up by hardware that can do the job of turning the various digital streams into beautiful music. Some of the companies behind the new multiroom systems are established hi-fi brands that are bringing their long expertise in sound design into a new era of streaming. This seems to prove more musically successful than an IT company learning how to design loudspeakers.

THE APP & EASE OF USE

With sound quality established, the app is probably the other most important element of a modern multiroom system. Does it make it easy and pleasurable to browse your own existing music collection? Can it seamlessly switch from your own music to online sources? Does it look beautiful, using album artwork and good design, or does it look worryingly like a company making its first ever app?

SERVICES & FORMATS

Does the system deliver your favourite online streaming services, whether that be Spotify, Deezer, Pandora or just well organised internet radio? And for your own music collection, can it play plenty of file-types — especially AAC and Apple Lossless for Apple users, or FLAC above CD quality if you're gathering a high-res collection? Most systems have a hole somewhere in their support — make sure it doesn't render part of your collection obsolete.

SYNCHRONISATION

If you plan to create stereo or surround pairings of your various speakers, the speed of synchronisation can be important for accurate sound and for stereo soundstaging in particular. HEOS and Pure Jongo are the industry leaders in this area. But if your speakers will all be in different rooms, this doesn't much matter.

WIDER COMPATIBILITY

Some multiroom systems are built on a 'platform' and will therefore allow a mix of brands to be used. Definitive Technology uses DTS Play-Fi, for example, so its system is compatible with those from Polk Audio and others. It is, however, early days still in the multiroom world, so the ongoing success of these platforms is hard to predict.

EXTRAS

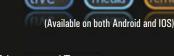
The little things can make a difference. With Bose's SoundTouch units you can start them by pressing a preset button and you get a physical remote control as well as the app — major additions of convenience. Systems with Bluetooth or Apple AirPlay benefit from being easily able to operate outside their specific apps. Sonos speakers have Ethernet sockets carrying internet to other gear. We mention useful extras in the reviews that follow...

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Bluesound

Right from the first play, Bluesound's excellent app and top-notch hardware combine to deliver a great-sounding high-res capable multiroom system.



Bluesound comes from a group of companies which includes both NAD and PSB Speakers. This hi-fi expertise shines through in the sound quality, but equally importantly the control app is attractive, well-developed and effective in navigating music at home and online.

f you've been following the launches of new multiroom systems, you'll be aware of the series of industry accolades and awards that have identified the Bluesound system as something special. It comes from the Lenbook Group of Companies, which includes NAD and PSB Speakers — we are already seeing developments whereby NAD products can act as additional members of a Bluesound set-up. And from the unboxing to the first listen, the quality that has earned such widespread praise is confirmed in both the players and in the software that controls them — both essential sides of the wireless multiroom coin.

This is also one of the more expensive systems, of course. The Bluesound Pulse proved a great-sounding wireless speaker, but at \$1299 it is also one of the costliest, the largest, the heaviest and the hardest to hide, particularly in a small second room. Bluesound doesn't yet have any smaller standalone solution, though we are informed that a smaller Pulse Mini is on the way for mid-2015 (with built-in Bluetooth).

But then, as it has been explained to us, Bluesound is being presented first and foremost as a way to upgrade your existing hi-fi. Add a Node or a Vault to a system of any quality to stream online services and play networked music — music at 24-bit quality, indeed, piped hot into your treasured hi-fi, along with those streaming services.

With your main hi-fi sorted, the rest of the system forms an extended family of wirelessly linked players, but without replacing any high-quality hi-fi where you have it. We have to applaud that approach.

The Bluesounds don't have Bluetooth built in, but a January firmware update added the ability to stream to a Bluetooth adaptor plugged into the back of any unit — the company says "The IOGEAR GBU521 is the supported Bluetooth 4.0 adapter for use with Bluesound Players. The use of other Bluetooth 4.0 adapters may not be fully supported by Bluesound."

Meet the family

Bluesound is no Sonos copycat. Some of the other systems follow the Sonos line-up unimaginatively closely. But only the Bluesound range has a 'Vault', which can rip CDs to internal storage as well as doing all the usual streaming and playing stuff. Only Bluesound has a stereo sub-sat system, called the Duo, allowing a second room to have proper stereo, not the near-mono that inevitably emerges from a single-box solution. For this review we examined the Pulse, the disc-ripping Vault, and the Node. A new Pulse Mini has just been announced.

THE VAULT - \$1599

Currently a unique offering among the new multiroom wireless systems, the Vault has a 2TB hard-drive on which it can store music files, including those it rips itself from its own disc drive. Then it connects to your hi-fi system of choice, working much as does the Node, playing not only its own stash of files but also those on your network and all the streaming services available to the Bluesound family. Review: p23

THE PULSE - \$1299

Currently the only standalone speaker in the Bluesound family, this substantial unit can network via your home Wi-Fi to stream Bluesound's various online sources and your networked music up to 24-bit/192kHz. It's a fair size of speaker unit at 42cm across and 19cm deep, but that gives room to include a decent set of drivers and amplification which here uses NAD-developed DirectDigital circuitry. Review: p22

THE POWERNODE - \$1199

As its name suggests, the PowerNode adds amplification to the Node's abilities, making this a "just add speakers" solution to bring the Bluesound eco-system to a room which doesn't have an existing hi-fi. Again the amps use NAD's Digital Direct technology.

THE NODE - \$749

The Node is the basic Bluesound receiver, plugging straight into an existing hi-fi to deliver the system's streaming abilities and networked music as a simple upgrade to any system. It can connect via Wi-Fi or, for maximum signal stability, via a Wired Ethernet connection. Review: p24

THE DUO - \$1699

Another unique offering in the multiroom world, Bluesound offers this pairing of subwoofer and 'bookshelf' speakers as a neat solution for bringing the world of Bluesound to spaces where smaller speakers may be more discreet than the big Pulse system. They'll deliver improved stereo separation over the Pulse too.

test wireless multiroom

Setting Up Bluesound...

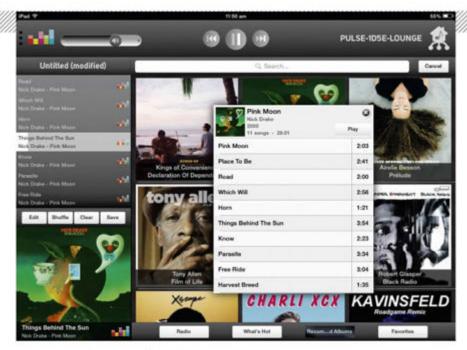
Bluesound's set-up is one of the simplest. When plugged in, each Bluesound unit (except the Vault, see review) creates its own local Wi-Fi network. Log your smartphone, iPad or computer onto that, type setup.bluesound. com into any browser and you should see all the controls which normally reside under 'Configure player' in the Bluesound app. At this stage you just select Wi-fi set-up, choose your network, type in your password, and wait for the green LED atop the Bluesound to turn blue. And you're done.

For additional Bluesound units, you just go to the app's left pop-out menu and select 'New Player Setup'. Tell the app which player you're setting up and you get easy and clear instructions. This worked nearly first time every time for us, a rarity among all these wireless multiroom systems! It was also robust — we were able to return to a player left untouched for weeks, and it would pick up where it left off, just thinking briefly before restoring the library it had built from our network shares.



Share share share! — we've never had a system find so many shares on our home network. It might seem confusing, but it's highly versatile.

We do a lot of home networking in our job, and we don't remember EVER being presented with such a comprehensive list of available shares from our network drives and computers (pictured), including our master iTunes folder. We picked the most music-filled and returned to the main menu while the Bluesound system began indexing our tunes, ready to make them available under the Music library tab. This indexing took a while (there's a small message: e.g. "indexing phase 1 - 5759 songs processed") — after all, our six selected shares had upwards of 30,000 tracks in them, including our whole high-res collection twice over. That's no problem, though — Bluesound estimates its maximum capacity as being around 80,000 tracks (depending on the quantity of metadata and the size of album artwork). More than that, and it'll just stop indexing. When you add new music, remember to reindex via the app.



The main Bluesound app screen, showing the playlist queue (top left), 'now playing' (bottom left) and a browsing szreen (main window). Press the top left logo for more options, top right to go to zone/room grouping.

Bluesound - the app

By the time you've finished set-up, you're already becoming familiar with Bluesound's app. It's a doozie, the best among the new systems, efficiently designed in keeping everything within easy reach, but also graphically beautiful, making good use of the larger tablet/iPad layout and showing album artwork where available. It flips from vertical to horizontal and seemed best for us in the landscape shape, where it could prop up on its Smart Cover.

The main screen (above) shows your queue or playlist on the left with the currently playing track below with album artwork if available. The main area of the screen is used for navigation around whichever music source you're currently browsing. So for your Library of networked music, you have view by artists, albums, songs, 'New' (recent additions) and playlists, also simply

There are three listed streaming services here in Australia — Deezer, Rdio and TuneIn internet radio. But the Bluesound devices also work with Spotify Connect — use the normal Spotify app and just throw it.

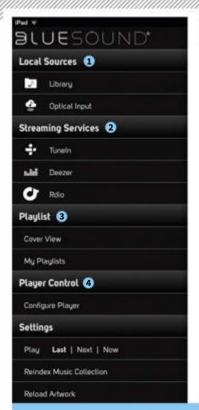
by 'folder' if you want to browse in a more DLNA-type manner. That's about as versatile as you could hope for. It uses album artwork for navigation, which can slow things down just a little as it pauses for the artwork to load before displaying the text names.

If you're done browsing around, you can choose a 'Cover view' of your current queue/ playlist, which is an attractive way of seeing what's coming up next.

To switch sources, you pop open the main left menu by pressing the top left logo. Bluesound calls this the 'Navigation button', and it is usually the Bluesound logo, but if you're in, say, Deezer at the time, it may be replaced by that logo (as above). On this pop-out menu, called the 'Navigation Drawer' (see panel above right) are nearly all the available options and settings. At the bottom are settings, and at the top are 'Local Sources' and 'Streaming Services'.

Your ongoing queue of music can combine items from streaming services and networked music, though their quality and level may not always match perfectly. There are three listed streaming services here in Australia — Deezer, Rdio and TuneIn internet radio. But the Bluesound devices also work with Spotify Connect — use the normal Spotify app on your device and just throw it over. The international list of streaming services includes WiMP, Slacker Radio, Qobuz, HighResAudio, JUKE, Murfie, HDTracks and TIDAL, so come the day their services spread to Australia, we'd hope to see them appear on Bluesound units here.

And since a recent upgrade now allows Bluesound to work with a Bluetooth dongle (not included), you can throw any app you like via Bluetooth, though this is perhaps not quite in keeping with the emphasis on sound quality first! This will also address the one strangely missing source — your own device.



Navigation

Bluesound's pop-out Navigation Drawer gets you quickly to the essential options.

- **1 LOCAL SOURCES** include your library of music from networked sources, and any equipment plugged into external inputs these can also be shared with other Bluesound units.
- **2 STREAMING SERVICES** offer three listed streaming services here in Australia Deezer, Rdio and TuneIn internet radio. But the Bluesound devices also work with Spotify Connect use the normal Spotify app on your device and just throw it over. Bluesound's Australian distributor Convoy International advises that more services will be added as they become licensed for Australia.
- **3 PLAYLIST: COVER VIEW** changes the usual browsing window into a simple display of cover art, including songs queued for playback for easy access.
- 4 CONFIGURE PLAYER makes available various settings including a top volume limit and (slightly strangely) a bottom volume limit (default set to -90dB). There's an option for 'replay gain', which will adjust level based on volume adjustment metadata tags from your audio files. 'Output mode' defines a speaker as left, right, or mono, so you can create stereo pairs of Bluesound playback units.

There is, oddly, no way to play music which is on your controlling device itself.

As with most of these systems, we used Deezer as our test for streaming services. Once pointed to our subscription, we could browse, search, easily access recommendations and favourites, all with artwork coming through for a far prettier presentation than some other systems allow within their apps.

When we called up BBC Radio 2 through the TuneIn option, it not only showed a nice big Radio 2 logo, it listed the day's radio schedule below (helpfully listed in Australian time, too, so Steve Wright in the Afternoon started at 8am).

Songs were a little slow to serve when selected individually from Deezer, often with a five-second wait — if you were having a party you wouldn't want to be picking as you go. Avoid this by building playlists — in fact Bluesound kinda forces you into playlisting and queuing, and you may find yourself clearing the playlist of unexpected entire album selections rather regularly! But this you can do with a single press.

There's a neat trick here to speed up playlist building. Whereas most apps offer you a choice each time you select a track ('play now', 'play next' or 'play last'), Bluesound more neatly makes you choose your default preference in advance on the side menu, then always does that. 'Play now' will always interrupt the current song with the new one, 'play next' will always drop songs next in the playlist, etc. The option to switch preference is easy to reach, so this is convenient and quite a time saver.

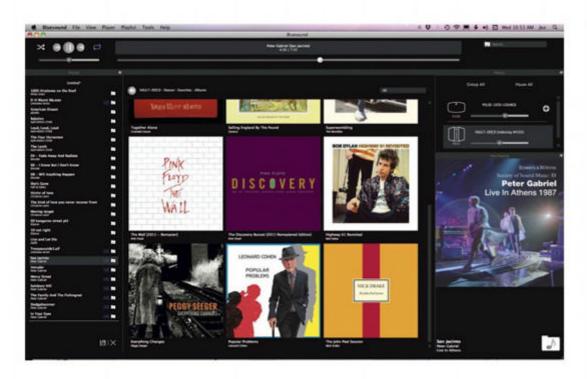
Once a playlist was running, the delay in starting streaming tracks was unnoticeable.

Volume control seemed a tad flaky — the slider could take a long time to respond, as if the app was busy elsewhere, catching up later a moment later. The hard controls on our iPad didn't work when we first plugged up the system but were activated in a recent firmware upgrade, and now offer the smoothest control. When needing to mute the Pulse for a phone call, we found it quickest (and most reliable) to get up and tap the light on the unit itself, upon which the Pulse would stop, emit a small pulse of music, then go silent (is this where it got its name?).

The last section of the app organises and groups your players. Press the Players icon at top right and your current players are listed, along with their currently playing song. You can separately control their volumes, and easily group them for synchronised playback.

Self starting

In addition to the software available for Windows and Mac OS X computers (below), we also found that if we had a queue running through the Bluesound Pulse, say, we could return days or weeks later and press the multipurpose 'mute' button on the top of the unit to resume the playlist without the need to open the app. This provides an 'instant on', encouraging you to start the music playing as soon as you walk into the room.



PC & MAC SOFTWARE

Bluesound has software available for Windows and Mac OS X (shown left), and this offers a benefit beyond simply a separate interface — it means the Bluesound system can be used even when every smart device in your home is dead/ lost/away/charging. Some other systems are completely inoperable without the app running on a smart device, but here you can pop open the Bluesound program on your Mac or PC and it's all there with an even better interface. we reckoned (on the Mac certainly). This rapidly became our preferred Bluesound control interface for general use.



The Pulse is currently the only standalone speaker unit in the Bluesound ecosystem — so just as well it proved to be a doozie, sounding sweet and powerful across a wide range of material whether streaming or locally stored.

he Bluesound Pulse is currently the only standalone speaker unit in the Bluesound eco system (a smaller Pulse Mini is on the way), but what a speaker! From the front the Pulse isn't too imposing, but it is deep, and heavy, too — if not the largest wireless speaker we've ever reviewed, it's among the very largest of the wireless multiroom breed. It uses its capacity along with excellent sonic design to prove one of the kings of this whole review collection after being compared directly alongside the top speaker units from its rivals.

IN SUMMARY

Bluesound Pulse

wireless speaker \$1299

- + Top-notch performance from a speaker unit
- + Oodles of power
- + 24-bit file compatibility
- Quite a large unit
- Less presence than some
- Bluetooth needs dongle

as a bi-amplified Direct-Digital Amplifier by NAD Electronics, with 80W total power and a mere 0.005% THD.

Control will be via the app or PC/Mac software, of course, but it has more buttons than most in the Bluesound range — touchpads for volume up and down, next/last track, and a central mute button, the light of which doubles as a colour-changing indicator of various things. If you had a queue playing when

you quit playback, then you can resume just by

This unit has an optical digital input (this can

be made available to other Bluesound units) and a USB socket that can take a stick or FAT32-formatted

drive of files. It has an Ethernet connection if you

can hard-wire it to your network, but it's perfectly happy on a Wi-Fi network; we experienced no

streaming issues at all with files up to 24-bit/96kHz

and only rarely with files at 24-bit/192kHz.

Bluesound doesn't declare the Pulse's driver

complement in literature, and it's hard to see

through the thick front grille, but we gather it

combines two full-range 70mm aluminium-coned

drivers with a 122mm bass driver, each powered by

its own dedicated Class-D amplifier; this is described

Sweet music

pressing that central button.

With it connected and playing, it simply powers along with all manner of music, filling a room with a sound that balances beautifully from a big and genuinely deep bass through a luscious midrange up to a clear treble — there's no honk, no holes, no mush from this impressive performer; it certainly demonstrates the skills of the Lenbrook team that lies behind both PSB Speakers and NAD.





To compare it directly with the same songs playing on some of the other manufacturers' larger speaker units, the bass guitar of Lou Reed's Walk On The Wild Side emerged from the Pulse as a single instrument with solid form, its lower bass integrated with the higher elements of finger slide and pluck. Compare this with the Pure Jongo T6 where there were two distinct elements — a bass 'woomph' and the more percussive 'shape' of the instrument entirely separated. Or the HEOS 7, which sounded rather fizzier in its upper midrange and offered a bass which resonated and pushed out more at the very bottom, but without the natural balanced presentation of the Pulse that had us not even seeking an EQ control for this unit; it sounded just right. Of its rivals, the Definitive Technology W9 proved its closest competitor sonically.

The Pulse was limited only in stereo spread, being ultimately box-bound, but only rarely betraying this in its sonics with an occasional bloom to an upright bass, or a slight boxing of male vocals. It was a joy to live with —as good a one-box solution as we've ever heard.



fter feeling the bulk of the Pulse, the Vault is surprisingly light, despite being fractionally higher and deeper than the Pulse, though squarer across the front, and of course containing no heavy amps and speakers within. Instead it has a vertical CD slot and an internal hard drive of 2TB, onto which it can rip your CDs to make available at the swipe of a touchscreen to any Bluesound player in your home.

The Vault plays into an input on your existing hi-fi either with normal analogue RCA cables (the connection sockets for this were a little infirm on our review unit) or from its optical digital output; it is in operation, then, just like the simple Node receiver/player but with that additional CD drive and music server. It has two USB slots, one for service and one to which a stick or hard drive of content can be attached.

It is also the only Bluesound product which cannot be networked via Wi-Fi — this one must have a hard Ethernet connection, this decision presumably driven by the need to serve its stored files reliably out to other players demanding them, perhaps to several at once if requested.

Loading CDs is easy, though it's by no means clear first time which way round your CD should be — put the label on the right, otherwise it just spits your CD out again! It rips and ejects automatically, though you can follow its progress through the Bluesound

IN SUMMARY

Bluesound Vault

streamer & digital library Price: \$1599

- + CD ripper & 2TB storage
- + Full Bluesound abilities
- + 24-bit file compatibility
- No Wi-Fi, needs Ethernet

app if you wish (keep pressing 'Update', since it doesn't deliver rolling updates). In the app you can also configure the rip format to be either lossless FLAC, lossless WAV, lossy MP3, or a combination — FLAC+MP3 or

WAV+MP3. We set it to FLAC and gave it some fairly obscure CDs, but it successfully identified them via the cloud and ripped away. When we gave it a CD-R that it couldn't possibly identify, it made no query, just ripped it as 'Unknown CDs, Track 1' etc. Oddly there is nothing at all in the Vault's 55-page User Manual about ripping CDs, let alone renaming them, but you can use a metadata editor to fix things (MediaMonkey, JRiver or MP3tag for PC, iTunes on Mac for MP3s or VLC for FLACs). But when renaming tracks you must fill in Artist, Album and Album/Artist, and then delete your whole Bluesound index and reindex everything again. This is quite a kerfuffle, yet the Vault doesn't offer the option of not ripping unknown discs, or of naming them as you go, or through the app. It's one of Bluesound's few needed improvements.

The only time we experienced any glitches was when replaying from its hard drive while ripping a CD at the same time. And then but rarely. Otherwise the Vault was a joy to use and to hear, its sound the equal of that from the Node, again highlighting the sonic credentials of the Bluesound family.



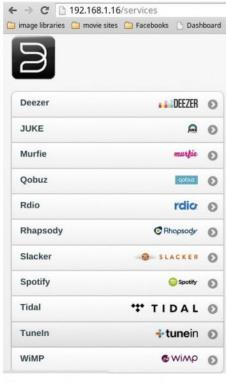
Bluesound Node

he Node is a key Bluesound product, plugging into an existing hi-fi (Lenbrook has pictured it above next to one of its own NAD amplifiers) and taking advantage of all the Bluesound goodness at the best quality your hi-fi can portray.

In action it's exactly the same as the Vault (previous page) but without the CD ripping and hard-drive storage, so it is also significantly smaller, just 20cm wide and 15cm high. After connecting to your network via Ethernet or Wi-Fi, it streams networked files and online sources, playing through a choice of analogue or digital (optical) output to an input on your amplifier, AV receiver or any other hi-fi. There is a USB slot which can play files from a USB stick or FAT32-formatted hard drive, and the usual mute button and indicator light on the top.

Again its analogue output proved top-notch, speaking well of the DAC implementation within, and of course control was a joy thanks to the excellent Bluesound app and the available software to run on PC or Mac computers.

If you want to start your wireless and online streaming experience by bringing an existing hi-fi up to date, with the option of adding high-quality streaming to other areas later, the Bluesound Node is our current recommendation.



 Log on with a browser and you can see all the services supported, even outside Australia.

OVERALL VERDICT

Bluesound...

These multiroom systems require three things - good sound, good services and a good app. Bluesound has, in our opinion, delivered the best combination yet available. The app is attractive, easy to use, and provides access to a good range of services while allowing local network streaming of music right up to high-res 24-bit/192kHz files. The system as delivered lacks Bluetooth to allow full compatibility with any available service, but this has been added in software if you plug a suitable dongle into the relevant unit. And there is clearly a plan for further evolution — a circuit module has recently been released which can turn a NAD M12 digital preamp or NAD C 390DD amplifier into a Bluesound receiver. We love the Vault concept for ripping and storing CDs, while the Pulse proved an exceptional wireless speaker unit with a sweet and powerful sound. We even got hacky with it, finding not-available-in-Australia services by logging on to the system via a browser (screenshot left) - we briefly enjoyed high-res streaming from Tidal in the UK, demonstrating again the value of Bluesound's sound-first philosophy. +





HOME CINEMA JUST WENT THROUGH THE ROOF

A Dolby Atmos® home cinema is not just about installing the latest AV Receiver The design, performance and positioning of every speaker in the listing space is critical. Krix has been specified in over thirty Dolby Atmos® commercial cinemas, which means we have the knowledge and expertise to ensure your home cinema delivers the true Dolby Atmos® experience.

Krix.... experience sound.





Bose SoundTouch





An unusual and useful member of Bose's SoundTouch family is this package of SA-4 amplifier, SoundTouch wireless adaptor and lovely little circular SoundTouch controller — you can add any speakers, including outdoor speakers, to deliver an extra zone of Bose SoundTouch. This highlights one of our other favourite things about this system — each unit comes with its own traditional remote.

ose has taken a clever approach to its system. Rather than develop a whole series of new wireless multiroom products from scratch, it has taken several of its already-successful products and added the wireless streaming and multiroom abilities. While you can't necessarily upgrade a Bose unit you already own, it does mean that the company is delivering familiar products like the Wave radio and its speaker docks (which are docks no longer), enhanced by these new abilities.

And the name of the SoundTouch platform says it all. What we particularly love about the Bose systems is that you can set them up and use them without any need for a smartphone or tablet. It has apps for these,

LIFESTYLE & CINEMATE SYSTEMS

All Bose's Lifestyle home theatre systems now come with SoundTouch (the Lifestyle 535 is pictured right), as does the SoundTouch Stereo Jewel Cube Wi-Fi music system (below). Three out of the four CineMate home theatre systems are also SoundTouch enabled, requiring only an optional adaptor.

of course, but it will also work just fine using only a PC or Mac computer. Indeed once you've done the initial setting-up, you can start a Bose SoundTouch product playing with nothing but your finger — press any one of six preset buttons to launch a Pandora channel, say, or an internet radio station. It's easy to underestimate the advantages of this until you live with it — we reckon this instant-on functionality must significantly increase the amount of time the average user will have their hi-fi playing. Even when our HQ was overflowing with multiroom speaker units during these tests, we'd often start the Bose playing first, simply because it was so easy. That means more music, so we love it! And of course it means better value from the product for its users.

Bose was certainly canny enough to realise that this preset system is a powerful piece of ease of use, which is most likely why they named their streaming platform after this simple idea — SoundTouch. And this has recently moved to its second iteration



These two SoundTouch Series II Wi-Fi music systems superficially resemble the company's successful 'docks', but here the iPod/iPhone dock section has been replaced by SoundTouch's streaming abilities, plus the very useful inclusion of Apple's AirPlay streaming. Reviews: p29/30.

The smallest of the three SoundTouch Series II Wi-Fi music systems is a portable option able to operate on its rechargeable batteries — though outside the home you'll need to plug your device in, as its SoundTouch and AirPlay streaming abilities require a home Wi-Fi connect to operate.

The latest version of the longstanding Bose Wave Music System adds a platform underneath the main unit to bring the SoundTouch and AirPlay streaming abilities together with the Wave's existing CD player and DAB+/FM/AM radio. See: p29.

test wireless multiroom

Setting Up SoundTouch...

Products like the longrunning WaveRadio have always been utterly plonk and play in their ease of set-up and use; Bose wants its products to just work. But the whole SoundTouch platform works through your own home network, with each device connecting via Ethernet or Wi-Fi as available. (As always, a wired connection is inherently superior in both reliability and bandwidth, but we kept our Bose review units on Wi-Fi the whole time and never experienced drop-outs.)



 App assistance — Bose's well-designed app can lead you through the set-up process without the need for a printed manual.

While networking complicates things, Bose has kept things laudably simple, with a couple of distinct procedures for setting up each unit and adding it to the system. If you use the app for smartphone or tablet, you first power up your SoundTouch device, then look on your smart device for the local Wi-Fi network that the device itself creates. Connect to that, come back to the app, give it your home network password, name the player, wait for the likely update to go through, and you're done. Not only is this an improvement over the system used for SoundTouch when it first launched, we also like that as this all happens, a list of contextual queries is shown on the right of the app, e.g. "What does the software update do?" and "How long will this take?" (From 4 to 20 minutes, is the second answer.)



 Questions questions! — While you are setting up, the app shows possible help queries on the right of the screen to solve possible problems.

Alternatively you can use the computer software for PC or Mac, which requires you connect the SoundTouch device physically via USB to the computer to give it your network instructions — easy enough with the smaller units, but a bit inconvenient if shifting around the bulk of, say, the SoundTouch 30.



PC and Mac software controllers are available — of the systems we reviewed, the Bose is easiest to use when a smart device is not around.

(SoundTouch Series II), which has added more streaming services, a better multiroom implementation, and software enhancements to the system based on feedback from users.

Meet the family

Bose has created quite an ecosystem for SoundTouch Series II (see previous page), with three standalone speaker units, the Wave Music System, four Lifestyle home theatre systems, a stereo Jewel Cube plus Acoustimass option, a 'just-add-speakers' amplifier package, and three more SoundTouch-ready CineMate systems. With all of these also boasting AirPlay streaming, there's not much the company doesn't have covered, except perhaps a unit that merely adds SoundTouch to an existing hi-fi system. For this test we reviewed the SoundTouch 30 and 20 standalone systems, while we recently spent time with the Wave Music System.

The app

We confess that when we first encountered the Bose SoundTouch app, we thought it looked so simple as to be rather dull. We were wrong — its simplicity is a great merit, and the look is maintained whether you're on a tablet, computer or smartphone; indeed

"spectacular versatility in delivering so many conventional sources — CD, DAB+/FM/AM radio — coupled with the streaming power of SoundTouch and AirPlay"

it is perhaps the best app of all these reviewed systems for smartphone, given the options are so bold and clear.

Those six presets are always there — you can select them via app, via the remote controls provided with each unit, or using the six buttons on the SoundTouch devices themselves. Setting them is equally easy — any time you're listening to an internet radio station, a Pandora station, a shared network folder, a playlist, you can press and hold one of the presets to store that as one of your six. Again you can do this from the app, the PC software or the buttons on the units themselves — it's hard to go wrong.

But there are only six presets, note. If you have several SoundTouch devices around your home, quite likely being used by different people, those six presets are universal — it's not six per machine, it's six per SoundTouch account, and all devices go on the same account. Whether you think six is enough for you or not will depend on your listening habits and your family — in a fractious family, we imagine ground rules will have to be set to prevent preset override arguments! For a couple, or for our lonely reviewer, we found six to be enough. Indeed on coming home we'd nearly always press either preset 1, which was set to shuffle between all our Pandora artist stations, or preset 2, set to BBC Radio 2. Such creatures of habit are we.

To go beyond your presets, you press the thin 'Explore' layer to the right of the app, which opens a menu of options. In Australia these currently include Deezer, Pandora, Spotify, Internet Radio, and the option to 'Add music' from your home network any selected shares then appear as separate Music Libraries. You can add NAS drives. though we had some issues accessing anything from our WD MyBookLive unless we actually rebooted the NAS drive while the SoundTouch app was up and running — and it seemed we'd need to do this every time we came to use the system. This issue will likely vary with different NAS drives and also may be affected by intermediate devices such as network switches.





Startlingly simple in its presentation, the Bose app (shown here on iPad) keeps those six presets always available, with the main area of the screen used for 'Now Playing' (above) or for browsing through sources (right).

Formats remain something of a weakness as well. With the move to Series II, Apple Lossless now plays up to 24-bit/96kHz, in addition to MP3, WMA and AAC files, but there's still no WAV or AIFF, DSD or DXD support — and no FLAC, which really is an omission these days.

What worked admirably was using the Bose controller for Mac on two separate Apple computers, from which we could add our two separate iTunes collections. These were added in full (30,000+ tracks) with full playlist information, and tracks were served with their artwork shown on the Bose app. This playlist access is especially useful since the Bose system doesn't make a queue as you

play material; unless you're on a streaming channel or a playlist, music will often come to an end and you have to go manually hunting for more tunes track by track.

Quietly AirPlaying

There is one enormous bonus lurking within Bose SoundTouch systems — they are Apple AirPlay compatible. Users of iPhones and iPads, Apple computers and even (with a cheap workaround app) Android devices can throw any music, any streaming service whatsover to their Bose systems. That means you can use native apps — Spotify, Deezer, Music, Podcasts, everything — and just flip the audio stream across. Bose seems almost shy of mentioning it in their literature, yet AirPlay is a monumental bonus of compatilibity and convenience for all Apple users. PC and Android users can also send via DLNA.

In its original iteration, the actual multiroom part of SoundTouch had a significant limitation — you could direct audio to either one SoundTouch unit or all of them. You couldn't group just a subset. So if you had, say, one in the lounge, one in the dining room and one in the bedroom, you couldn't just have the two in the living areas playing; it was all or nothing (though with individual volume control, you could always silence the unwanted ones). With Series II, as the current models are called, there's proper grouping available, though we only had two units at any one time, so couldn't fully test this. Series II has also added a search function for music libraries, which is handy because the SoundTouch app lacks alphabetical jumplists for long lists, and it could take an awful lot of scrolling to get down our enormously extensive list of artists. +

Wave Music System

e reviewed the Series I of the Bose Wave SoundTouch Music System — you can read our full review on AVHub.com.au (use the QR code to the right for direct access, if you wish). While we've heard better sound quality up at this



\$999 price, the Wave is extremely enjoyable within its volume limits, and certainly offers spectacular versatility in delivering so many conventional sources — CD, DAB+/FM/AM radio — coupled with the streaming power of SoundTouch and AirPlay.

Scan the QR code to read our full review of the Wave.





Bose's popular standalone music systems gain the full SoundTouch experience of streaming online services and networked music. It's a powerful combination, yet delightfully easy to use.

he SoundTouch 30 Series II presents a fairly enormous profile to the world — far higher than any competitor among our review systems at nearly 25cm high, and wider at 43cm than either Definitive Technology's W9 or the Bluesound Pulse. It looks significantly less deep, but in fact the back bows out to 18cm depth, with more required for the mains plug to stick out. So your first decision is whether you've got anywhere to put it where it won't dominate your space.

Second is what kind of balance you're aiming to achieve. If you're a casual music listener who likes a bit of radio, the SoundTouch 30 may simply be too much for you. It's a good all-rounder, but its sheer size can sometimes work against it, especially when an advert comes on the radio or a track with a dance beat and high levels of low bass. When



IN SUMMARY

Bose SoundTouch 30

wireless music system Price: \$899

- + Big, powerful and enjoyable sound balance
- + Easy start with six-preset system; also Apple AirPlay
- + Comes with remote
- A large unit
- Not for casual listening

we reviewed the Series I version of this unit we noted this tendency to emphasise low bass on certain types of material; EQ has now been added (several levels into the settings) to tailor things to your taste or adjust for different kinds of room positioning. This is limited to just a bass control slider — which indicated that its default position is with bass cranked to the max! We tried taking it down, but this thinned things too much, highlighting the other occasion the SoundTouch 30 can sound objectionable — tracks mixed on the edgy side. The recent Billy Joel version of Maybe I'm Amazed emerged with too shrill a vocal, especially in direct comparison with the friendlier Bluesound Pulse, which kept this roughness in check (noting its higher price, of course). On Jessie J's Bang Bang, which has surprisingly little in the way of pumping bass, everything was a little too lively, whereas the Pulse delivered more authority.

But these tracks were the exceptions. The corollary was that the Bose could deliver more clarity on vocals, where the Bluesound's Pulse's reserve could slightly recess them. With the low-down simplicity of the new and unlikely Dylan album of ex-Sinatra songs, the Bose lifted every nuance of his croaky voice to clarity, and over long listening sessions the SoundTouch 30 delivered an overall highly enjoyable balance, and without direct comparison to the other players here, we'd be raising barely an objection. It's clear, well separated, nominally stereo; we loved having a remote control as well as a smart device and computer software available to control it; and that SoundTouch one-press system really did make the Bose our first choice to get instant music playing when we came home at the end of a busy day.



Bose SoundTouch 20

ar more manageable in size, less frightening to find looming over a small room, the SoundTouch 20 offers the same Bose SoundTouch experience made slightly smaller and, for our money, perhaps more useful. It's a good wireless speaker for the money, with a rich radio-friendly sound. It delivers well next to a Sonos Play:5, the Bose less spitty and equally capable of nudging up levels to deliver a sizeable output before congestion starts to creeps in. We enjoyed it particularly with our streaming presets and internet radio in particular, where it smooths over the lower bit-rates but still has the power to punch out the tunes enjoyably and musically.

There isn't the scale of the larger players, of course, and the sound it delivers is powerful if not particularly dynamic — friendly but not fast. Though the balance doesn't go to the bottom octave of the larger players, the SoundTouch 20 balances the upper bass transition into the lower mids well, with just a bit of insistence in the upper mids and a touch of splash in the treble.

This compact but powerful presentation may not have the hi-fi feel possible from the higher driver count of the larger Bluesound Pulse or DefTech W9, but it's thoroughly enjoyable and never offensive.

Note we also have a standing recommendation for the slightly smaller SoundTouch Portable, which won a 2015 Sound+Image Award in the Wireless Multiroom category.

IN SUMMARY

Bose SoundTouch 20

wireless music system Price: \$599

- + Great performance for its size & price
- + Easy start with sixpreset system; also Apple AirPlay
- + Comes with remote
- No FLAC support



OVERALL VERDICT Bose SoundTouch...

The Series II iteration of

SoundTouch has not so much radically altered the system as refined it — indeed Bose HQ in the States told us that this was one of the first times the company has tried this sort of 'crowd feedback' whereby they would find out what needed fixing for the release of Series II by watching their helplines and forum posts, then reacting accordingly.

The results include adding those useful contextual questions to the app, a more useful multiroom implementation, a good search function and also some EQ, though this last is limited to a bass slider. The wide range of available systems with SoundTouch is clearly a benefit of Bose's system, and we love the variety of controllers — an easy-to-use app for smart devices, PC and Mac software, and actual traditional remote controls too! The 'SoundTouch' ability to start the whole thing with a single preset button press is gold. The two wireless music systems reviewed here are both good sounding units — if not the ultimate in hi-fi, their friendly and powerful presentation is hard to criticise, plus we can vouch for the quality of the Portable version. We miss some things — no FLAC, WAV or AIFF playback, no ability to queue up tracks from different sources, and we didn't find it very NAS-drive friendly in our particular system.

But some of the other multiroom systems here could definitely learn from the Bose app's simplicity, those easy-to-use presets, the usefulness of having a proper remote, and the inclusion of point-to-point streaming using AirPlay or DLNA. The more we used Bose's SoundTouch system, the more we appreciated these merits, and particularly the speed at which they allowed us to access music.

Definitive Technology

A speaker company renowned for its cleverly compact solutions adds the Play-Fi streaming and multiroom platform from DTS. Á marriage made in heaven?

efinitive Technology is a company that knows a thing or two about squeezing performance out of slimline speakers — its hi-fi ranges hide subwoofers in speaker sides and have a tendency to amaze listeners with unexpected bass performance in particular. The company is less known for streaming or tech products, so it has made sense for them to adopt a streaming multiroom platform developed by DTS, called Play-Fi. This has the additional benefit of being able to work, stream and share with any other brand of Play-Fi speaker — these currently include Definitive Technology, Polk Audio, and the lesser known brands Wren and Phorus.

By taking the streaming technology and app shell from DTS, Definitive Technology can combine these with its own speaker expertise and deliver a wireless multiroom system that has the potential to combine the best of all worlds. How does it play?

Meet the family

The Definitive Technology ecosystem currently includes two sizes of wireless speakers — the long rectangular W9 and the smaller cubic W7. There are the usual two electronics units, the 'W Adapt' for streaming the Play-Fi services into an existing hi-fi system, and the 'W Amp' as a just-add-speakers solution. And finally there is one of the few soundbar options currently

on offer, the W Studio, which is a soundbar plus subwoofer solution, and has been receiving rave reviews for the quality of its movie presentation (which doesn't surprise us, given the prowess of other soundbars from the company, notably the Mythos series). Unlike the Sonos Playbar solution, the subwoofer is not optional — it is integral to the presentation of the W Studio.

For this review we examined the two wireless speaker units, the W9 and W7.

The app

Definitive Technology's own control app is called simply 'Definitive Technology', and there's also a Utility app, which doesn't do anything much for users of the W9 and W7

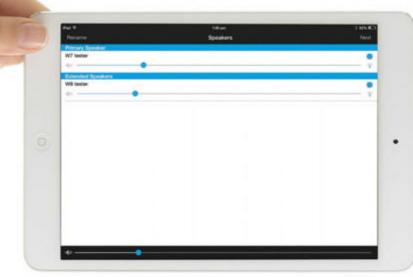


The W Adapt is the 'upgrade your hi-fi' solution from Definitive Technology, connecting to an existing amp or receiver to deliver DefTech's streaming solution. Usefully it also has one optical and two analogue inputs, and digital outputs too.

The larger of the two standalone wireless speaker solutions, with drivers on the side as well as the front, and again useful inputs on the rear — two here, one optical, one minijack analogue. Review: p36

The smaller of the two standalone wireless speaker units, the W7 is (roughly) a 17cm cube with an unusual configuration of drivers — the sides have bass radiators and additional tweeters, with the goal of achieving sound beyond the bounds of its box. It has the full abilities bestoeed by the DTS Play-Fi system, and despite its smaller size, it retains the two inputs from its larger brother. Review: p35.

wireless multiroom



wireless speakers, but which can be used to adjust EQ for the W Amp and W Adapt if they're paired with Definitive Technology speakers. You might think this would be more convenient within the main app, but as we soon realised, the main app is built by DTS Play-Fi, and there have been only aesthetic tweaks for its different licensees. So that DefTech-specific addition has to be delivered as a separate app.

As you'll see in our player reviews, the performance of the W-series wireless speakers proved excellent. The Definitive Technology control app, however, is not the best. It's just not pretty — the main screen (overleaf) uses only the left 20% of the screen space to list the possible sources of music. Select one of these and you are presented with a similarly sparse list of your connected speakers (shown above). Pick one of those

The Play-Fi system requires you to choose a primary speaker, ideally the one receiving the strongest Wi-Fi signal. As throughout the app, Play-Fi delivers rather functional screens with large blank areas.

> and the app pauses to connect to that speaker, then you have to press 'Next' before moving on to the music page itself.

Once you've connected to a particular speaker, you can then change source without going through the speaker section again, but you can't, as on some systems, browse and build an ongoing playlist that mingles, say, songs from your device or your NAS drives plus songs from Deezer or other streaming services. So music selection is something of a chore when browsing. With music on your smart device you can browse in a wide variety of ways — artist, track, album, composer, playlist, genre and so on — but there's no apparent way to queue more than one track at a time for playback. You can at least play a whole album or playlist by selecting the first track and letting it play on or shuffle. So we did find that you end up reaching for the

Setting Up The 'W's...

Each element of the Definitive Technology system connects through your home network either by a wired Ethernet connection or via Wi-Fi. Set-up is nicely simple — when plugged in, your first 'W' unit should have a pulsing white light which indicates it is creating its own Wi-Fi hotspot. With the Definitive Technology app downloaded to your smart device, you get instructions by tapping the 'Add Play-Fi device', which leads you through the now-common path of connecting your device directly to the first unit's hotspot, then using the app you enter your Wi-Fi password — note that these units are able to use either 2.4 or 5GHz Wi-Fi bands. There is likely to be a software update to be downloaded at this stage, then that unit is ready to play. Repeat with your other units, and you're all set. We had no glitches in our set-up procedure at all, and the software updates took about three minutes per unit.



Several of the wireless multiroom systems reviewed this issue have made noises about creating a soundbar solution as part of the family, but only Definitive Technology has delivered one at launch. Sonos, of course, has the Playbar and an optional subwoofer; the subwoofer in this 'W Studio' is not optional, being an integral part of this 5.1-channel solution which includes a slimline 109cm-wide soundbar with three HDMI inputs, plus additional optical and analogue audio inputs. It was unavailable to us during this review, but we certainly intend to return to the W Studio for a full review in an upcoming Sound+Image.

THE W AMP - \$849

This is the 'add add speakers' solution in the 'W' range, quoted at 2 x 150W by DefTech, and again generous on the inputs and outputs with optical and two analogue inputs and with analogue outputs and an LFE channel for a subwoofer, in addition to its speaker terminals. EQ is available if used with Definitive Technology speakers.

app to restart music far more often than on systems using queues and playlists.

Streaming services

Radio-type streaming will just keep on playing, of course, and things ran smoothly when we signed into our Deezer account and streamed our favourite albums that way — they sounded great, though again the interface is far more basic than you can enjoy on Deezer's own app or some competitors.

Only two other streaming services seem to work in Australia through this app — Pandora, and internet radio, which offers text-only navigation of the thousands of available stations in the usual ways; there are no alphabetical jumplists but it's very good at rapid scrolling through lists. Spotify is on a promise to be added in March/April.

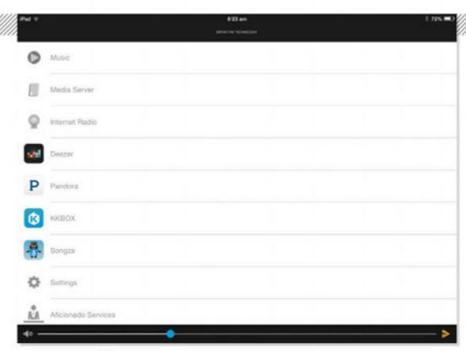
Two other services are listed — KKBox (a Taiwanese streaming service not yet available in Australia), and Songza, which is a free service in the States. We managed to sign up for both of these using VPNs, but neither would stream to the DefTech system because of geoblocking. So they might usefully have been removed from the local version.

A final tab marked 'Aficionado Services' does not actually lead to more music but to a statement of Definitive Technology's promise to provide the best in service to the 'aficionados' who have bought its products.

As for local music, you can play your on-device music, and the Play-Fi apps can also play from DLNA servers on your network, with the 'Music Library' tab showing any shares, which can be browsed in the usual way, though it's plain vanilla DLNA — there is no caching or indexing of files for more rapid subsequent display, as on, for example, Bluesound and Sonos.

Playing from NAS drive storage proved a bit flaky and not very format friendly. The literature does list WAV, AAC and high-res (though downsampled) FLAC as acceptable formats, and it did play WAV and AAC files from our iOS device. But via DLNA from our

"If a new app is released, all our objections could melt away, leaving proper and pretty access to the excellent Definitive Technology speaker units on the end of it."



 Plenty of space — the Definitive Technology app is near-identical to other DTS
 Play-Fi apps from Polk Audio and Phorus, and is sadly low on intuitive operation and high on white space. The 'Now playing' screen (below) does display album artwork.



NAS drive it would play only MP3, WMA and CD-quality FLAC, not displaying AAC, Apple Lossless, WAV, AIFF or DSD files, and announcing "unsupported sample rate" for FLAC files at 48kHz, 96kHz or 192kHz. But from a PC share it could indeed play higher-resolution FLAC. Being a DLNA client there's no integration with Mac iTunes music libraries unless you install a DLNA/ Twonky sharing software on your Mac.

Use your computer

There is, however, one way around all these limitations — a dedicated Play-Fi program for PCs (Windows 7 and 8). The link provided in the W9 manual didn't work for this — go instead to https://play-fi.com/apps/windows. Here you get a choice between a free Windows 'app' and 'DTS Play-Fi HD'.

We downloaded the free app (above right) and it took over the PC output, sending everything to the DefTech W7 speaker. And that sends everything — any streaming service, high-res files played using VLC etc.

To control more than one Play-Fi speaker in this way, you'll need to upgrade to the DTS Play-Fi 'HD version', which costs US\$14.95 for a licence key. This also allows you to separate and send audio from specific applications rather than taking the whole Windows system audio feed.

Primary vs extended

Controlling more than one DefTech W unit from the app is a bit unusual, and for us proved flaky. The system is to select one 'Primary Speaker' then tick a check box for other speakers you want as 'Extended



Small but handy — the PC software gets around format incompatibilities, although there's a US\$14.95 fee to control more than one speaker.

Speakers' (screenshot on p33). For us that second checkbox would stubbornly never tick, until distributors Advance Audio tipped us off that the fix for this is to yank the plug on all units and plug them back in. After this we could indeed pair things up. We also note that DefTech warns that should your primary speaker become detached from the network, all the extended speakers will likely be disconnected as well.

For zone creation and speaker pairing, this is messy compared with, say, the excellent pinch-to-pair of HEOS. We also could not follow the instructions in the manual for stereo pairing any two W speakers (the "three dots" mentioned in the manual as the entry point for this just never appeared in the iOS app).

As mentioned, we recognise that this app comes direct from DTS Play-Fi, not from Definitive Technology. The interoperability between Play-Fi systems should be a bonus, allowing mixed systems to operate with ease. But the weaknesses in the app are many, and seem all down to DTS. (We downloaded the apps for both Phorus and Polk Omni, in case they offered better control or file compatibility, but they were identical to the DefTech app except for a few aesthetic tweaks.) The various licensees of DTS Play-Fi should be screaming for improvements — and of course if a new app is released, all our objections could melt away, leaving proper and pretty access to the excellent Definitive Technology speaker units on the end of it. +



The W7

rom its first tune, the W7's performance impressed for one so usefully small — 15cm wide and about 17cm high and deep, easy and neat for any size of room without taking over the décor. It has a set of controls on a metal bar at bottom right, the same size as on the W9, but relatively larger on this smaller unit, extending almost halfway across the W7's face.

The driver complement on this near-cube is most unexpected. The front



face has a 25mm aluminium-dome tweeter in each top corner, plus a single four-inch mid-bass driver. But on the two side faces there

Definitive Technology W7

wireless speaker Price: \$649

- + Great sound for the size
- + Side drivers create a spread of sound
- Needs space at sides

is another tweeter in each back top corner, plus a bass radiator the same size as the active mid-bass driver on the front. The four tweeters get 10W of power each, the active driver gets 30W.

So don't tuck the W7 on a bookshelf with books on either side — its side faces need space to send that treble information outward and deliver the impressively wide and non-boxy sound that it achieves. This is its most impressive achievement — it doesn't sound at all box-bound, and separates stereo even though there's little sense of distinct left and right unless your head is right up to the cloth grille. It presents this sense of width along with a remarkably tight and punchy bass, and without the boxiness usual from this size and shape of speaker unit.

In our direct A-B testing this openness and clarity compared wonderfully with, say, the larger but somewhat stodgier Bose SoundTouch 20, while the ability to separate musical strands exceeded that of a Sonos Play:5, which sounded rather flat in direct comparison when playing the laidback new Bob Dylan album. The W7 proved itself to be a great little wireless speaker.



The W9

he W9 challenges for largest speaker unit among all these systems, yet does so rather unobtrusively compared with the vast frontage of the Bose SoundTouch 30 or the relatively noticeable Bluesound Pulse. In comparison the W9's black fabric grille and black Perspex-like topplate allow it to recede visually. It is also a useful few centimetres less deep than either of the other two, making placement a little easier — but be aware that like its smaller brother the W7, it has sidefiring speakers, so it needs space on either side.

The controls on the unit itself are unusually placed, sticking out from the bottom right corner on a protruding metal plate (see below), but these add a useful pause/play and next track selection to the usual volume controls — there's no mute here, but the pause button does a similar job.

Round the back is quite a tight port bay with an optical digital input, an auxiliary analogue minijack



input, a USB port (upgrades and charging devices only), an Ethernet connection, and a little blue button marked 'set-up',

which has a nice tactile bounce to it (but don't hold it down too long, or you have to re-pair the speaker all over again).

The driver arrangement is also unusual — bass and treble fire forward from the front, using twin 5.25-inch bass drivers and 25mm aluminium-dome tweeters, while an additional stereo pair of 5cm "full-range" drivers fire sideways, in what Definitive Technology calls a "Tri-Polar dispersion pattern that radiates sound off of the surrounding walls". The power behind these units

is quoted at 2 x 70W for the big woofers, plus 10W each for the two tweeters and two full-range side drivers.

How does this unusual arrangement perform? Impressively in many ways. Down low the W9 proved the only player in this group which could truly resonate along with the crazy bottom bass on Neil Young's *Walk With Me*— the bottom note during the middle 8 of this song set our listening room a-thunder. This is dreadfully impressive performance.

Diana Krall's 'Wallflower' album showed how much brighter and potentially more clear a vocal could sound on the Definitive Technology when played alongside the relatively reserved Bluesound Pulse. On such gentle songs the W9 didn't perhaps deliver as grand a scale as the Pulse, but many will prefer its crisp-edged vocal presentation to the reserved upper mids of the Bluesound.

Those side speakers do seem to assist the creation of a stereo image — on Pink Floyd's *Run Like Hell* the W9 properly separated the dual vocals to left and right channels, and while the Bluesound Pulse gave the impression of more solid bass depth on this track, the W9 certainly opened the track up more in the higher frequencies for the vocals and echo-laden guitar parts to achieve cut-through.

On occasion this liveliness can go too far, as it did from Deezer with Billy Joel's recent power-packed take on *Maybe I'm Amazed* — the vocal unreasonably raspy and the whole upper mids overpeaking on presence. But it excelled with a modern chart mix — OMI's *Cheerleader* (Feliz Jaehn remix) got its best performance from the W9 — the treated vocal, the trumpet and its reverb, the low synth bass and the poppy percussion in marvellously layered and separated elements; it again exceeded the clarity of the Bluesound Pulse here.

Ditto for Coldplay's *A Sky Full of Stars*, another 'best delivery' through the DefTech — less insistently thumpy than on the big Bose, more spacious and less restrained than the Pulse.

So while we found ourselves vacillating in a material-dependent way over whether we preferred the W9 overall to the Pulse, we are completely confident that nobody investing in this fine wireless speaker will regret it on the basis of sonic performance. Definitive Technology has more than proved its skills in the loudspeaker department.

IN SUMMARY

Definitive Technology W9

wireless speaker Price: \$1099

- + Excellent sound
- + Side drivers create a spread of sound
- Needs space at sides

OVERALL VERDICT...

Definitive Technology's strengths

are marvellously implemented in a fine-sounding pair of wireless speakers, the W9 and the W7. The W9 is among the best wireless speakers we've ever enjoyed, and the W7 makes an excellent solution in a smaller space, highly competitive for its price. The app is not provided by DefTech, but by the DTS Play-Fi people, and it's unsatisfactory - not pretty, flaky on formats, low on available services except via the program for PCs (which overcomes most of the problems of the app). Fix the app — as surely DTS must — and this will then be a leading multiroom system. +



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HEOS by Denon

With stylish players backed by Denon's '100 years of sound' experience, HEOS aims for the modern generation of music-loving smartphone users...



HEOS was one of the first wireless multiroom systems to arrive last year to challenge Sonos. It was partly developed here in Australia, and two of its elements took out our 2015 Sound+Image Product of the Year Award in the Wireless Multiroom category. hey call it 'HEOS by Denon', or just HEOS for short, but the Denon tag does emphasise that this is a system developed by an established audio company, one of the key differentiators HEOS boasts over the market incumbent, Sonos. The others are its easy set-up with access to streaming sources and 'legacy' media, a very simple user experience, and multiroom operation with industry-leading synchronisation.

In fact the development story is rather more complex than it simply popping out of the development team of Denon's parent company D&M, and there is also a strong Australian connection. When we attended the Sydney launch last year, the 'big reveal' moment came when we were ushered out of the presentation room for a walk up the road to discover a D&M Innovation Centre hiding away in Berry Street, North Sydney.

It turns out that the technology behind HEOS was born here in Australia as the

'Avega' system of wireless speakers going back almost a decade. The founders include Peter Celinski, now at D&M in the US, and his brother Tom, who has worked for Linn in Scotland, along with two other ex-Linn founders, Max Ramsey and Stuart Bryce.

Avega funding came from Professor Neil Weste and David Skellern, both formerly of Radiata Communications and Skellern of NICTA — Radiata it was that took up the CSIRO's Wi-Fi patent and made the world's first Wi-Fi chips. With Radiata subsequently bought by Cisco, it was perhaps no surprise that Cisco launched the first Avega-based products at CES in 2009, while the Avega tech was also licensed to Cisco, Dell and other audio brands. Then Altec Lansing acquired Avega in 2010 — but Altec Lansing itself was sold 18 months later. D&M "quietly made an offer" and acquired Avega in 2012.

Since then the Australian team has developed the technology and the applications behind HEOS, while using Denon's expertise

HEOS LINK - \$599

The Link is a wireless preamplifier which can add HEOS to any existing hi-fi or AV receiver, thereby bringing the modern world of HEOS streaming online sources and networked music to existing systems.

HEOS AMP - \$899

The 'just-add-speakers' solution of the HEOS family, delivering 100W of power to your speakers of choice for a zone with the full HEOS abilities of online music sources and network file streaming. The Amp was one of our 2015 Sound+Image Award winners in the wireless multiroom category. Review: p42.

A HEOS

HEOS 7 - \$999

The largest of the standalone wireless speaker units at 48cm across and 20cm high, adding one further amp, an active sub and twin passive radiators to the HEOS 5 driver complement. Again it plays online sources and networked music, with the a network-shared input and USB. Review: p41

HEOS 5 - \$689

The middle of the three wireless speaker units at 29cm wide, with four amplifiers to drive stereo tweeters and midrange drivers plus a passive radiator. Again it plays online sources and networked music, again with a shared minijack analogue input and USB slot. Review: p42.

HEOS 3 - \$529

Playing vertically, horizontally (or wall-mounted), the smallest HEOS speaker can also be paired to work in stereo. Aside from online sources and networked music, there is a minijack analogue input and a USB slot for connecting sticks or hard drives of music, all shared to other HEOS players.

wireless multiroom

in cabinet design and audio tuning. We gather that ongoing development will continue with the original core 'Avega' team in North Sydney, along with a second HEOS R&D Centre in California, plus Denon in Japan.

Meet the family

HEOS launched with three wireless speakers of rising size, numbered HEOS 3, HEOS 5 and HEOS 7, plus two receiver units, one with amplification so you just add speakers (called the Amp) and one without amplification so you plug it into an input on any existing sound system (the Link). All these units are available in a white or black finish, and all of them have useful auxiliary inputs which can be shared with all other HEOS units in the home — one analogue minijack input, and one USB slot into which sticks or hard drives of music can be plugged, and which are then shared to other HEOS players.

There is one last member of the family not pictured in the group photo on p39 — the HEOS Extend, a unit that can extend your Wi-Fi network beyond its current area; the dual-band N network will be available for all your devices, not only HEOS.

For this round-up we examined the HEOS 5 and HEOS 7 wireless speakers, while we also have experience with the HEOS Amp, which received a 2015 Sound+Image Award in the Wireless Multiroom category.

HEOS – the app

HEOS is thoroughly modern in focusing primarily on streaming

music sources and app control. Where some of these systems provide PC or Mac control software, and Bose adds traditional physical remote controls, the HEOS system assumes a smartphone or tablet device will always be present and available to control the system — you can't get any music out of your HEOS system without it. This is important to understand — everyone must control it with the app; if anyone is home alone without a smart device, they simply can't use the music system.

But assuming you tick the modern family smartphone-savvy box, the app is very easy to use. Like the Bose SoundTouch app, it goes for clarity over beauty, offering large button sizes, partly because there's no separate tablet version of the app. It works only in vertical mode, so that you can't use, say, the stand iPad Smart Cover to prop it up on the coffee table in landscape mode — we had to keep the iPad flat on the table instead. But that aside, it really is very clear and easy to navigate.

Of particular handiness are the three bottom buttons which take you to essential screens. Since these buttons are nearly always present, they assist in getting around this app far faster than some rivals where you need to back up through several layers of programming to get back to the music control section. On the HEOS app the 'Rooms' tab quickly accesses the section for selecting your player; 'Music' gets you straight to your music sources; and 'Now playing' takes you straight to the current track

Rapid navigation — the three bottom tabs ('Rooms', 'Music', and 'Now Playing') are highly useful for getting quickly to the main sections of the app.

so you can control music, make playlists and enjoy large album artwork where it is available.

There are usefully extensive settings a little hidden away in the top left of the Music screen. These include the ability to adjust bass and treble for each of your wireless speaker units, and we were delighted to find we could adjust the brightness of the tasteful glowing blue-purple lights under each unit, which might be a distraction in darker listening rooms, or especially a bedroom.

Set up of the various available music sources is also under these settings. These currently offer Spotify and Deezer, which require subscriptions, plus Pandora and TuneIn, which are free — TuneIn requires no account at all, but it's useful to have one for storing favourites which will then be retained anywhere else you might be using TuneIn. We should applaud HEOS here in properly regionalising its app — when using HEOS in Australia, it shows you only the services that will work, not frustrating users by mixing them up with ones that are geoblocked to Australia (as do several rivals here).

If you are accustomed to using these music services via their own native apps, they may seem rather plainly presented under the HEOS app, with simple text listings rather than pretty album artwork. HEOS, like Sonos, requires you to access everything within its app, and when using Deezer, for example, you are presented with a simple folder structure with fewer options, no charts and no images. Since there is no Apple AirPlay or Bluetooth here which would allow you to use the native apps and throw them, we created a workaround by using the full Deezer app to create a playlist, then playing that playlist from the HEOS app — this allowed full and attractive browsing while still replaying through HEOS, the best of both worlds.

Filetype support falls somewhere in the middle of our collection of multiroom systems this issue. It does well enough with standard-res files, happy with MP3, AAC and WMA, and for FLAC and WAV files up to CD quality (actually up to 16-bit 48kHz). There's currently no support for Apple Lossless, AIFF, DSD/DXD or anything above 48kHz. Nor is there any integration with iTunes libraries.

Setting Up HEOS...

All HEOS units connect by Wi-Fi or Ethernet to your home network, and thereby access music from the internet as well as shares on your network. To enter your Wi-Fi password, use the HEOS app on a smartphone or tablet to guide you, first making a minijack connection between the first unit and your smart device, then pressing the 'Connect' push-button at the back of the unit before entering your password. For additional units around your home, select 'Add device' using the app. Any required firmware updates are downloaded during this process, and we encountered no set-up issues at all.

The HEOS Extender unit may be useful to anyone who finds their home Wi-Fi to be weak in certain areas; this uses dualband N Wi-Fi to strengthen and extend the home network where required.

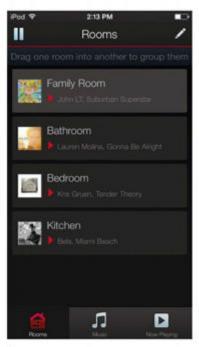


 Setting up — a cable is provided to make the initial connection by minijack to enter your Wi-Fi password. The HEOS app provides step-by-step instructions.

Overall then, the HEOS app worked well, but it lacks a certain pizzazz. Its downsides are its oversimplicity of design when navigating services like Deezer, the lack of a landscape or tablet-sized layout, and the absence of a control program for Mac or PC to operate the system in the absence of a smart device (when your phone is recharging, broken or otherwise absent). Many were the times when we'd start something playing on a HEOS system, take the iPad downstairs, then come back up and find ourselves unable to do anything except volume up/down and mute. Even a small physical remote control would fix this.

As always, these are things that may be fixed — local distributor QualiFi hints of a major next-stage roll-out later this year. Certainly we found the HEOS app to be practical and robust in that it operated pretty much glitch-free throughout our extended time with the HEOS system.

One highlight of the HEOS app is the simplicity of creating multiroom zones by pairing up different HEOS units. Under the 'Rooms' tab each HEOS unit appears with its currently playing music (if any), and you simply 'pinch to group', bringing together different HEOS units to play the same music, with independent volume controls available. This was by far the neatest multiroom implementation of any of these systems.



In the zone — the HEOS app's 'pinch to group' creation of multiroom zones is the best implementation we've yet seen.



he ascending scale of HEOS speakers reaches its zenith with this '7', but the whole family

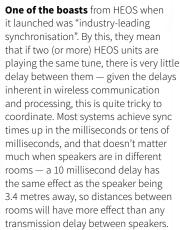
shares a high build quality and the slightly space-aged styling with its curves and polygoned end-cheeks. Each unit also has a USB slot and analogue auxiliary minijack, so you can plug up additional sources which can be shared across the network to other HEOS speakers or receivers.

Picking the best HEOS speaker is not simply a matter of buying the biggest you can afford — consider the different spaces you'll be putting the speakers in. The HEOS 7 is a big speaker — 43cm across and about 20cm high, and it boasts five active drivers (twin tweeters and mid-woofers plus 'subwoofer') and two passive radiators to boot. We thought its sound to be simply too big for small rooms such as bedrooms or kitchens, at least with its default bass setting, which was so generous that it could dominate the midrange, while a smooth but strong treble squeezes from the other extreme, so that some vocals could sound quite recessed. The balance reminded us of how TVs are displayed in store with all their video settings maxed up to impress. For our taste we used the app's settings to tame the treble to minus 2, bass to minus 2.5. We nudged up the volume some, and then thoroughly enjoyed a more natural balance with the real musicality

which flowed from the HEOS 7, especially as we turned it up. This larger unit has power aplenty from its five internal amplifiers, with great clarity while playing at higher volumes. It produced some sonic thrills — the lowest of the big toms on Jessie J's otherwise ignorable Bang Bang rolled forth with impressively realistic resonance. There is musical precision too — we streamed Kate Bush's Them Heavy People from Deezer (then the whole album), and Kate's vocal was precisely shaped and delivered a layer above the drums and enjoyably strong yet tight bass guitar — there was proper separation, and with those earlier adjustments, the frequencies remained balanced so you could hear the music at its best. Although there was little stereo imaging, even from a couple of metres away, the HEOS 7 did present a real impression of a layered soundstage.

Some might prefer the Bluesound Pulse's smooth authority or the DefTech W9's spread, but in direct comparisons the HEOS 7 was the most immediately exciting of the three, its lively midrange and treble feeding detail and ambient information aplenty, and the bass resonant and large, even once reined in to our EQ preference. And the HEOS 7 loves (indeed needs) space, with the clever trick of sounding good whether you're sitting right in front of it or listening from the next room. It's a fine unit.

In Sync...



But when pairing in stereo within the same room, as you can with the HEOS 3 speakers, synchronisation needs to be as tight as possible to achieve accurate timing and stereo imaging in any critical listening position. This would become still more critical in a wireless 5.1 system should the HEOS system ever be supplemented by a soundbar product.

To our knowledge Pure with its Jongo system has the lowest officially-stated synchronisation time — 25 microseconds, a mere 0.025 milliseconds. Bose claimed "zero" at their launch, but when challenged with raised eyebrows amended this to "effectively zero". The HEOS team would tell us only that their system is "accurate to within a single sample", and if that means one divided by 44,100, that would be an impressive 22.6 microseconds — equivalent to a physical positioning accuracy of a tiny 7.7 millimetres.



HEOS 5 + HEOS Amp

e haven't a word to say against the HEOS 5 (above) — for our tastes it's the sweet-spot among the three standalone HEOS speaker units — a proportionally smaller sound than the HEOS 7, but we thought it better balanced, though we still nudged both the bass and treble EQs down just a little to calm the bass emphasis (the bass on Björk's *Aeroplane* caused it to spasm when played unEQd at a reasonable level) and to give the midrange a bit of space. Thus set, this is a fine unit at the size and price.

The HEOS Amp (below, \$899) is also a top unit for setting up a whole zone. It drives a pair of speakers of your choice, and you get a selection of bonus inputs too — the USB and minijack auxiliary input that are on all HEOS units, but also an optical digital input and a second analogue 'line in' on RCA sockets. There's also a subwoofer output and an



Ethernet socket should you wish to give it the higher reliability of a wired network connection. We set it up as our TV and music system in the lounge; with a pair of high quality bookshelf speakers and our TV audio plugged into its optical input, it made a great TV audio system with the benefit of all that streaming music goodness. The only caveat was that the TV volume had to be controlled via the HEOS app, which didn't impress the missus, but its internal amp performed strongly, proving more powerful and of higher quality than the equivalent Sonos product.

IN SUMMARY

HEOS 5

wireless music system Price: \$689

- + The sweet spot of the HEOS range great sound for the size/price
- + Full HEOS abilities
- + USB and aux inputs shared with the system
- Must use app to operate

OVERALL VERDICT

HEOS by Denon...

HEOS is a smart system — we can't emphasise enough that operation of any HEOS device is always and only via the HEOS app on a smartphone or tablet. But if that's a match for your lifestyle, then this is a system well worthy of further investigation. The speaker units are stylish and distinctive, the two larger units both delivering excellent sound, and the medium unit, the HEOS 5, proving exceptionally good value. The Amp also proved valuable for the quality of its power and its range of handy inputs, all made available across the network to other HEOS units. It is just a little format shy in not supporting any high-resolution music (by which we mean above CD quality), nor Apple Lossless or AIFF, but it feels more firmly focused on the offerings of online streaming services such as Spotify, Pandora, Deezer and internet radio, all of which are ably delivered here, and will be even more so if the app ${\sf gets}\ {\sf a}\ {\sf cosmetic}\ {\sf upgrade}\ -{\sf it}\ {\sf is}\ {\sf intuitive}$ and versatile, but could achieve more with album artwork, particularly in a landscape layout. We thoroughly enjoyed HEOS and its modern path to music. +



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f we were to say that LG as a company has little history in audio, we'd most likely receive letters of complaint from a reader who just loves their Goldstar High Fidelity system from way back when, or castigation from someone who was lucky enough to get their hands on one of the LG audio systems from a decade ago when Mark Levinson became their audio consultant following the closure of Red Rose Music. But as a whole, while we are happy to bow down in wonder before the blacks of their OLED TVs, LG is not a company to which we'd normally turn for an audio system.

If you feel the same, listen up. LG has delivered a highly competent system in Music Flow. The speakers are good, the app is attractive (and on the whole intuitive), and the technology scores on a number of points. To highlight just a couple of these, LG is one of the rare breed with which, like Sonos, you can avoid the vagaries of your home Wi-Fi and connect everything to a dedicated mesh network (but also Wi-Fi, if you prefer). And the LG Music Flow system is also properly high-res compatible.

Got your attention? Good. Read on.

How they connect

To create that dedicated mesh wireless network for the Music Flow, you add the little R1 (pictured below left) as the first step off your router, then connect each Music Flow product wirelessly to that. But (also like Sonos) LG recently released an update which allows you to use your home Wi-Fi network just like all the other systems here, and that's what we did. Like any enthusiastic customer we rushed to unwrap the speakers themselves, starting with the little H3, settling down to follow its minimalist pictorial instruction manual to get it connected.

Much as we dislike pictorial start-up guides with something approaching psychosis, this particular one basically just told us to download the Music Flow Player app onto our smart device (an iPod touch at this stage) and then follow onscreen instructions. These were clear enough, the only real choice being to tell the app whether you are giving the first unit an Ethernet cable to the network (improved reliability and bandwidth) or having it connect via Wi-Fi.

We chose Wi-Fi, which involved the usual procedure of connecting to the LG's own Wi-Fi signal (the LG system



Mesh it up — if you have concerns about the quality of your home Wi-Fi network, adding the \$79 R1 'Smart Hi-fi Audio Wireless Multiroom Bridge' allows LG's Music Flow speakers to operate on a separate and potentially more stable dual-band wireless network.

LG's Music Flow system proved exceptionally versatile, allowing connection through a home Wi-Fi or Ethernet connection, or using a separately created wireless MusicFlow network. File support is good, and each unit also has Bluetooth included for direct streaming. They even do high-res audio.

is compatible with both 2.4 and 5GHz Wi-Fi, so we gave it the latter), giving it our network password, then reconnecting everything to the home network.

We hit one glitch when the onscreen keyboard would not appear; we suddenly jumped a screen too far and couldn't get back; we had to reinstall the app. But the methodology was clear, and we later added the H7 as a second speaker with no problems at all.

Meet the family

The Music Flow range, which LG also seems to call "Smart Hi-Fi Audio", currently has three standalone speakers, and they follow the curiously consistent odd numbering among multiroom systems — the little mono H3 at \$249, the medium stereo H5 at \$399, and the largest unit, the H7, at \$549. There are currently two other units available — the HS6 soundbar and subwoofer, and that little R1 Bridge, which helps create a dedicated mesh

H5 (NP8540) - \$399

The middle of the three standalone Music Flow wireless music speakers, the H5 is like two H3s joined together and slightly angled. Twin 25mm tweeters and 8cm mid/bass woffers deliver in stereo, again with both network and online streaming plus Bluetooth.

wireless network. The one obvious omission in this eco-system is a simple receiver unit which could plug into an existing hi-fi to make it part of a Music Flow home.

STOP PRESS: Just as we go to print, LG has announced three additional Music Flow soundbars and a smaller portable speaker which can stream via Bluetooth when outside your home network, or via Wi-Fi when inside it. These can also be paired with the soundbars to act as completely cable-free surround speakers.

For this review we examined the little H3 and the large H7; we were also sent the R1 bridge, but since Music Flow is now perfectly happy on a good home network, we held the R1 in reserve in case we had network problems. We didn't, so we never needed it.

The Music Flow app

Finding the app a little cramped on the iPod touch, we relocated to iPad, though could find no dedicated iPad app in the iTunes store. But unusually the iPhone app looks great at iPad size, making good use of decent-resolution artwork, though it suffers the same problem as Denon's HEOS app — it has no landscape mode, so it doesn't rotate, which means you can't use your iPad on the usual stands.

When the app first loads it provides a nice tour of the various icons and introduces you to the 'mood' selector whereby you can have the skills of Gracenote select music from your



H3 (NP8340) - \$249

The smallest of the Music Flow family is 18cm high and

12.5cm wide, operating in

mono with a 25mm tweeter and 8cm woofer powered by 10+30W of Class-D power. In addition to its networking and streaming abilities, it has Bluetooth on board for streaming direct from your smart device. Review: p43.



H7 - \$549

The largest speaker unit, upgrading to 10cm stereo mid/bass woofers and some 3cm larger than the H5 in every dimension at 37 x 23 x 11cm. Network and online streaming plus Bluetooth and an auxiliary input offers versatility, and we were equally impressed by the sound. Review: p42.

HS6 (LAS650M) - \$799

A soundbar and wireless subwoofer solution which also includes LG's full Music Flow network and online streaming, plus built-in Bluetooth. Additional connectivity for its soundbar functionailty include an HDMI input and output, an optical digital audio input in addition to the auxiliary analogue minijack which appears on the smaller speaker units. The soundbar is 102cm wide, including four 8cm drivers, while the 9kg subwoofer has a single 16.5cm driver. Three more soundbar models are on the way.

wireless multiroom

The Music Flow app found our high-resolution audio collection and was happily streaming tracks at 24-bit/192kHz...





How do you feel today?

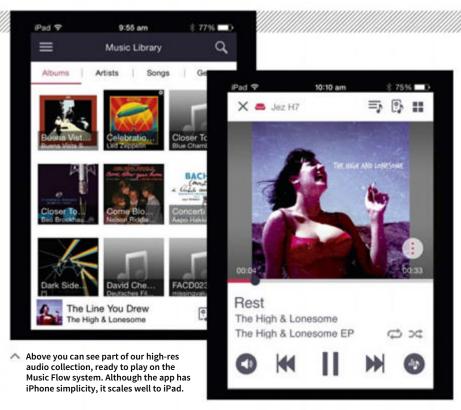
One of the first screens to greet you when setting up Music Flow is a panel marked "How do you feel today?" This leads you to the 'mood' selector, whereby you can have the skills of Gracenote select music from your catalogue to suit your mood.

Well that's nice and friendly, we thought, but our contrary selves immediately wondered whether it was entirely responsible to be offering a selection of sad music to people who declare themselves "Gloomy", or to throw more energy into the life of someone admitting to feeling "Aggressive" already.

Delight, then, to find that when we selected these options, the LG app requested a further clarification: for Gloomy we were offered "I want to listen to sad music" but also "I want to listen to exciting music." "Aggressive" folks will be offered "vibrant" or "relaxing" music.



What marvellous forethought and social responsibility! We warmed still more to the team that created Music Flow.



catalogue to suit your mood (see 'How do you feel today?' panel overleaf). These mood selections proved to be excellently curated by the cloud intelligence of Gracenote, and were based entirely on tracks accessed from network storage and placed into our 'Music Library'. (Tunes on the iPad/iPod touch itself were listed separately under 'My phone'.)

The list of network tracks it found was interesting — we had noticed the app indexing network files early on during installation, but at no point had we been offered a list of drives, nor asked where our preferred music shares were living; the LG system just went ahead and indexed stuff in the background from anything it could see.(Under 'Settings/ Music Library' you can control the syncing and give it some small guidance.)

High-res no problem

The second surprise was that the Music Flow app had found our high-resolution audio collection and was happily streaming tracks we knew to be at 24-bit/192kHz — no glitches, lovely sound. With no technical info screen available to guide us, we cannot judge if they came all the way from our NAS drive at full resolution, or were converted on the way by some instruction to a Twonky server. It doesn't much matter — they served smoothly and came through sounding great.

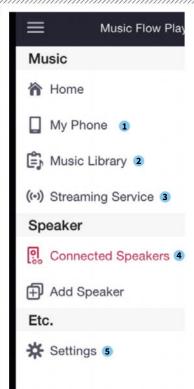
Even a 24-bit/96kHz Apple Lossless file played fine, so we ran through our format test files — no problems with AAC, MP3, Apple Lossless and FLAC up to 24-bit/192kHz (it actually managed to play a 24-bit/352.4kHz FLAC file but did so v-e-r-y s-l-o-w-l-y, i.e. it

misinterpreted the file as being either 88.2kHz or 176.2kHz and so played it at half or quarter speed). That's pretty good file compatibility, then, though a shame there's no support for WMV (Windows music users take note), WAV, AIFF, DSD or DXD files.

Navigation

The main navigation comes from a pop-out list of options — from many points in the app you will have to backscreen a good few times to access this key menu. First on its list are four options for music source — 'Home', 'My Phone' (music on your device), 'Music Library' (networked music), and Streaming Service, which currently offers a choice of Spotify and Deezer by subscription and log-in, and TuneIn internet radio (in which you can't enter account details, even if you have them). We logged into our Deezer subscription. ('Log in succeed!' it enthused.)

Below these music sources on the navigation panel are speaker options, for adding or checking your connected speakers. The speaker list brings up your different units and what they're playing (top right screengrab), though always after a delay of up to three seconds where it worryingly announced that "There is no connected Music Flow product". The thinking time on this regularly-used screen rapidly became the most annoying thing about the app which is, on the whole, easy and intuitive. But once through, it is certainly easy to link together whichever speakers you like, and to "change their function" (by which it actually means change input) from Wi-Fi to 'Bluetooth' to 'portable'. (By 'Portable' LG doesn't mean you can pick the speakers up and take them away on battery power; it merely switches to the auxiliary minijack input — into which you can plug your 'portable' device directly.)



Navigation

LG's pop-up navigation list proved simple and generally effective for finding and playing music.

- **1 MY PHONE** accesses music on your device (even if it's a tablet, not actually a phone).
- **2 MUSIC LIBRARY** shows you all the networked music that Music Flow has found on your home network. Unusualkly it indexes all this without so much as asking you to select a share or point it in the right direction it all happens automatically, and seems to work very well.
- **3 STREAMING SERVICE** currently offers Spotify, Deezer and TuneIn internet radio. The first two require a subscription.
- 4 CONNECTED SPEAKERS is where you go to select a speaker or change inputs (including Bluetooth); on our system there was a glitch where you're left waiting for a few seconds each time, facing the worrying announcement that "There is no connected Music Flow product". But once connected you can easily use this screen to group speakers or to change their input from the Wi-Fi network to Bluetooth or the auxiliary input.
- **5 SETTINGS** allows a degreee of control over music indexing, also useful extras such as alarms, and a small typographical error for selecting "Adavanced Settings".

Interestingly there are no EQ options here on the speaker menu screen for tuning the speaker performance, but these do exist on the 'Now Playing' screen (see under our review of the H7 speaker unit).

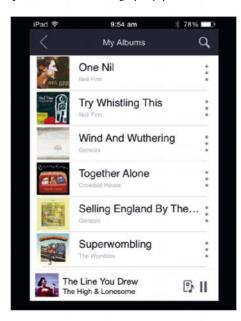
Music Flow doesn't seem to tie into any existing playlists (so for example the iTunes playlists on our device were ignored), but you can build your own permanent playlists in the LG app itself. These seem to be specific to the controlling device, however — the playlist made on our iPod touch did not appear on our iPad, for example. While this will certainly separate the playlists of different users, it's a limitation for users with multiple devices, as there seems no way to sync between them.

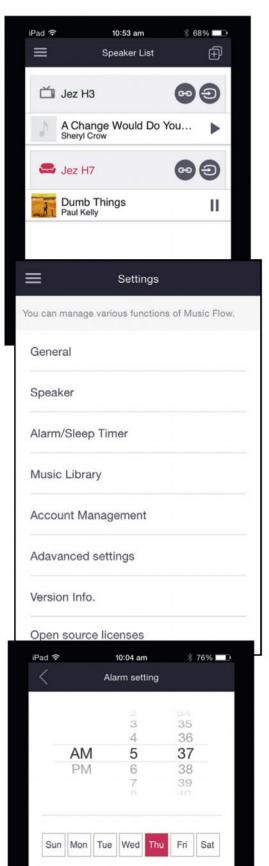
In normal play mode you select tracks to form an ongoing queue, and here the LG follows the common and intuitive protocol where pressing any track in your library (or on a streaming service) will play it immediately, while pressing and holding offers a choice of 'Play Next', 'Add to Queue', or 'Add to Playlist'. The queue neatly and seamlessly combines songs from different sources, switching between our Deezer selections and songs on the device.

But when browsing our on-device iPod touch library, selecting a track very often brought up a message that the LG "cannot play this file". Yet it would load up and show full screen artwork, and we could press the Play arrow and it would sit there on 0:00, and then eventually would say "Cannot play this file" again. Or sometimes it would decide that despite saying this it would play it anyway. Given there was no network involved in this, and it didn't seem to apply to particular file types, this was odd, and frankly annoying. Another oddity was being unable to clear the

queue completely. On all these multiroom systems that use queue systems, the queue quickly becomes clogged up with accidentally selected entire albums or tracks from earlier sessions that you're done with. Here you have to select *each track individually* to remove them from the queue. If you're up to several hundred, that's just not going to happen.

Otherwise the LG app was pretty well designed. There are alarm and sleep functions available (right), you can rename speakers to your desire and also choose an icon to match (couch, bed, TV etc). It gets to your music quickly in an attractive and fairly intuitive design; it made Deezer look pretty (below) and it handled our high-res music collection — the FLACs, anyway, if not the WAVs. For what looks very simple, the Music Flow app proved versatile and highly enjoyable. —





Speaker

Music Flow 1

Alarm sound

Cancel

wireless multiroom

LG's H7 proved a highlight of our testing — great sound, an app that can stream high-res audio, and excellent pricing too...



The largest of LG's 'smart hi-fi wireless network speakers' is half the price of the top model in some other systems, yet we loved the sound it made.

he H7 is a solid and capable speaker for the money. It is 37cm wide but a relatively shallow 11cm deep, making it an easy fit on narrower shelves, and with some bass quality adjustment possible from the distance between a back wall and its rear port (which doubles as a handy carry handle).

Its front metallic grille protrudes in a shallow 'V', giving the stereo pairs of 25mm tweeter and 10cm mid-bass woofers a slight angling to either side for their dispersal, and the whole speaker unit is suspended above a small airgap in the plastic casing; nothing ports into this space so we assume it's either aesthetic or provides protection against resonant coupling with the supporting surface.

The controls on the unit are limited to a nice rotating volume knob and a button that slightly clumsily either switches inputs or puts the unit into standby, often whichever one you didn't mean to do. There's no mute button, but the volume dial is quick enough to use when the phone rings. Also usefully, the hard volume buttons on our smart devices controlled the H7 directly, and continued to do so even when the LG app was in the background or the iPad was in 'autolock'.

There are three LED indicators, though rarely is more than one illuminated, since each



The whole family, showing the relative scale of the speakers

IN SUMMARY

LG Music Flow

wireless network speaker Price: \$549

- + Good sound for the price
- + Bluetooth, NFC and
- network/online streaming + 24-bit and FLAC support
- + Useful EQ settings
- Slight boxiness
- No WMV, WAV or AIFF

indicates the status of a different input — Bluetooth, Wi-Fi or 'Portable' (by which they mean the 'Aux' minijack). Once you're connected these are fairly redundant, and you can turn off the LEDs altogether via the app, making the LG speaker units even less intrusive.

A small NFC icon atop the speaker reminds you that NFC phones can pair with the speaker with a mere tap.

We mentioned the EQ in our words on the app. The H7's manual (which is applaudably included in full, hoorah!) rather worryingly calls these "sound effects" and then "pre-set surround fields", and describes the 'Bass' effect thus: "The Bass is Bass Blast. During playback, reinforce the treble, bass and surround sound effect." But that's just crazy talk; they sound fairly benign and indeed proved to be useful EQ presets. The default appeared to be 'Standard' which applied a reasonably modest bass emphasis, but if the bass port of your H7 is well supported we'd recommend the 'Flat' setting, or perhaps select the 'Custom' setting to tweak as you wish. For our tastes, the presets best avoided were 'Boost' (loadsamidrange) and especially 'Treble/Bass', which has a brutal U-shaped EQ where the midrange falls into an abyss. LG's decision to keep the EQ right next to the playback controls does make it easy to tweak on the fly for any particular material. It only occurred to us after our testing to wonder what happens once several units are linked together for group playback — does an EQ adjustment then adjust all speakers, or just one?

How's the sound? Completely competent; we had less time with the LG system than most, but ran the H7 for several days without once wincing at some musical maltreatment. With flat or standard EQ, all manner of material sounded solid and

LG impressed us with an audio system that deserves recognition on its merits, not merely as an AV bolt-on to the company's excellent TVs...



LG H3

enjoyable, nicely balanced and pleasantly resonant. We played Bette Midler's latest, the upright bass on Mr Sandman given mild emphasis to bounce along in the centre in front of Ms Midler's exuberant and richly portrayed vocal. A high-res stream of Pink Floyd's Welcome to the Machine showed that there's a reasonable stereo spread available from those angled drivers. There is just a slight boxiness to the tone — it does not open your ears to new sonic delights as can the very best multiroom speaker units. But then it's a heck of a lot cheaper than those, yet still impresses. One limit is sheer volume — it can go pretty loud but not to total partyville, and if you push loud material up there, things can start getting shouty and nervous. But a few notches lower than that, it'll bang out your tunes without a complaint in the world. We were impressed — the H7 is far and away the best audio product we've ever heard from LG.

he H3 has a great compact form factor — its outer shell is plastic, but its weight and solidity make it feel as much compact professional mini monitor as the lowest in the speaker line-up of this Music Flow range.

It's a mono speaker, $125 \times 175 \times 115$ mm, weighing 2kg and offering 30W to a single 8cm woofer and 10W to its 25mm tweeter. The controls on the top duplicate the H7's volume knob and central button but are here touch controls rather than physical ones.

Its sound is solid, like a Tivoli radio though without quite the sweet warmth, rather a punchy box-bound sound where cymbals can get a bit mashy and lacking in air, the bass underplayed and overlaid by the midrange which leads the balance, and close by on the desk its sonic limitations were all the more obvious close up. This is not to dismiss it entirely — it is certainly of a family with the H7, and perfectly listenable at moderate levels. But much louder and it did not provide the same enjoyable longterm listen.

Switching to Bluetooth the sound was slightly less precise, thickened, the edge taken off the slight cymbal mash by the lower quality digital rendering possible via Bluetooth.

We didn't have duplicate units in order to hear them paired up in stereo, but it would clearly deliver a power boost and stereo spread (at double the price, of course). This pairing would seem possible with any of the range, since once paired, you can use the volume control to allocate each to deliver only left or right channel, or its full complement of stereo (for the H5/7) or mono for the H3. (At one point we brought the H7 and H3 together and ran them as a sonically unbalanced stereo pair in this way, though with the synchronisation time and the tone differences, the stereo image was far from clear.) We gather a pair of H3s can also be paired with the Music Flow soundbar and sub to make a real surround solution; indeed three new soundbars have just been announced for the range, and a battery-operated portable H4 too (see p45).

IN SUMMARY

LG Music Flow

wireless network speake Price: \$249

- + Solid though mono sound at the price
- + All the Music Flow streaming abilities
- + Bluetooth and NFC
- Not for playing loud



Extras & Chat...

A couple of extras with the LG system — there is useful server software available for Mac and PC to ensure that your Windows or iTunes collections will be properly indexed by the Music Flow system. Perhaps less usefully LG has also extended its smart-home 'Home Chat' system to Music Flow, so once you've installed LINE on your smart device and done a certain amount of registering and recognising, you can then send your audio system instructions by 'text', and receive replies as if the audio system is talking to you. If anyone out there can work out a useful application for this, we're sure LG would love to hear from you.

OVERALL VERDICT

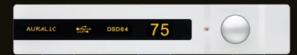
LG Music Flow...

There's a gap in the ecosystem here in having no little receiver to bring an existing hi-fi system into the Music Flow world. But the app and audio delivery is very good, streaming high-res music from network shares and seamlessly mixing those with on-device music plus Spotify and Deezer (Googlecast will follow shortly we gather). There's Bluetooth throughout, and well-priced players in the H3 and particularly the H7 (we can't vouch for the H5 or the soundbar systems, not having heard them). Most of all LG impressed us by delivering an audio system that deserves recognition on its merits, not merely as a bolt-on to the company's excellent TVs. Where will it all end, we wonder! +

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Panasonic ALL Series

Panasonic has gone with Qualcomm AllPlay for its streaming system. We're not too sure about that, but we love the two wireless speaker units.

hat Panasonic has here is two of the best value wireless multiroom speaker units currently on the market, but with an under-developed system around them.

This is oddly arse-about-face, given that Panasonic has not used a bespoke streaming solution of its own, but has gone with Qualcomm's AllPlay platform. This should be a bonus, allowing you to mix equipment from other manufacturers using the AllPlay platform, though at present this seems to be limited to Lenco, Medion (the Aldi brand) and the UK's Musaic. As with Definitive Technology's adoption of DTS Play-Fi, we had expected that a third-party platform offered to manufacturers under licence would be highly developed, attractive and easy to use. Instead the AllPlay app proved surpris-

ingly rudimentary. But as we said, the speaker units themselves proved great performers.

Meet the family

This is a small family, listed on the Panasonic website all mixed in with its other audio products, but consisting of just two speaker units, the SC-ALL8 and SC-ALL3, plus the SC-ALL1 unit which brings the streaming abilities to an existing hi-fi.





Set-up

The Panasonic units connect in what has become the most common connection method among these systems — you connect to their own Wi-Fi hotspot and input your home Wi-Fi details. The Panasonic system is listed as compatible with both 2.4GHz and 5.8GHz Wi-Fi, and it did offer us the 5G network so we chose it out of preference but it didn't connect, so we went back to our 2.4GHz band and immediately the connection was made. An update for the system was served, but unusually you have to wait until the update is finished then yank the power cable on the speaker, wait a full three minutes (we'd love to know why three minutes), then plug it back in.

The app

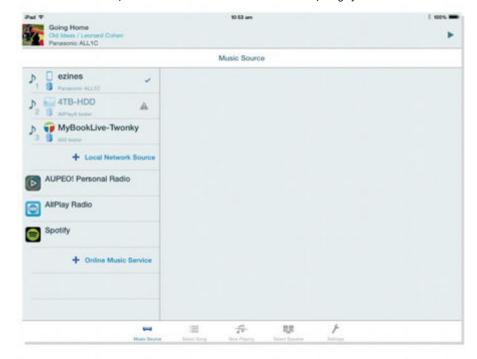
The Panasonic Music Streaming app is certainly easy to use, but mainly because it's among the most basic of those reviewed here. In fact we had it on our iPad already, because it's a nicely reliable point-and-serve app that we've used with other DLNA renderers, not just Panasonic's SC-ALL speakers.

The app handles music sources quite differently to most systems, setting up numbered music sources (see lower screen-

The app handles music sources quite differently to most systems, setting up numbered music sources — one from your device itself, one for each share on your system...



Simple but clear — the AllPlay app creates a queue of music and can follow playlists set up on your smart device itself (above). This device is numbered as source 1 (Ezines below) with other network drives numbered from there, and greyed out if unavailable.



shot above) — one from your device itself, one for each share on your system. You play a song (there's basic queuing available) and select the rendering device to receive it, in this case one of the SC-ALL speakers.

If it gets hung on "Connecting to a server", as it did regularly when navigating our NAS drives, then there's nothing much to be done than force quit the app (or just exit, if you're lucky) and start again. And after such a hang we found the app often refused all attempts to visit that server again, as if it was marked as unreliable or 'out of bounds' — you can see in the lower of the two screenshots above that source 2 (a WD NAS Drive) is greyed out and marked as unavailable. This is rather inconvenient if it's your main source of music, of course. After a time the app would reset, pretending nothing

had happened and granting another try at this forbidden territory.

The app also seemed to refuse connection to networked drives if our computer was connected to the NAS at the same time, which may well be the case for many users.

We experienced an oddness here with filetype compatibility. On the Panasonic website it says "MP3, AAC, WAV, FLAC, ALAC - yes", and we'd be pretty happy with that, though it might disappoint any longtime Microsoft users who have built up a WMA collection.

But we note from the downloadable-only manual that as a DLNA client, it supports only MP3, FLAC and WAV. Using Qualcomm AllPlay it should add AAC and Apple Lossless, and the Panasonic app allowed all these, though not entirely reliably

MAGICAL MERLIN



The new Musical Fidelity Merlin system and Round Table turntable are now available in Australia. A 50 watt per channel amplifier with inputs for phono, USB, aptX Bluetooth and line in digital or analog. High quality headphone amplifier.

Configurable outputs digitial or analog, fixed or variable. Matching loudspeakers featuring BMR full-range driver technology. The Musical Fidelity Round Table belt drive turntable is available with the system or separately.







wireless multiroom



Outside the app — the streaming services available don't operate within the AllPlay app, instead you use the native apps to throw the music to an AllPlay speaker. Pictured is the simple AllPlay Radio app.

in our time with the system. For a while it wouldn't play WAV or Apple Lossless from a NAS drive — but then later it would, and at high-res too.

So while rather unreliable, it was impressive when it worked — we got 24-96 WAV, ALAC and FLAC, even 24/192 FLAC all streaming through.

Since Qualcomm AllPlay is a platform used by other manufacturers, we also downloaded the control app for Lenco's multiroom system which uses the same standard. It turned out to be exactly the same thing in a more colourful wrapper! But it did seem to more consistently play files of all the advertised varieties. So many are the potential network variations in home systems that we suggest you try both and use your favourite.

Back in the Panasonic app there are three online music sources made available from the app — AUPEO!, AllPlay Radio and Spotify. But they don't work within the Panasonic app itself. Selecting any of them simply spits you out to the App Store so you can download the dedicated app. AllPlay Radio turned out to be a simple-looking iPhone-sized implementation of TuneIn that was able to play to AllPlay speakers. To use Spotify you'll need a Premium subscription (as you do for any of these wireless systems) and you can use Spotify Connect to pass playing content on to your AllPlay speaker of choice. AllPlay promises more services will soon do the same, including iHeartRadio and Soundcloud.

While this does allow the use of native apps, it makes AllPlay control a bit diffuse, half in-app, half outside, without full integration.



SH-ALL8

ell here's a feast — both Panasonic's speaker units proved to be excellent performers. The larger SC-ALL8 is a substantial unit, 37cm wide and 22cm high, though kept usefully shallow in depth terms at 14cm, making it easy to place on a shelf or desk.

It fits in five drivers, as shown in the exploded image below — twin 25mm tweeters in the top corners with 8cm mid woofers below; these are described as double-layer nanosized bamboo cones (the bamboo particles presumably nano-sized, not the cones themselves). Between these two-way stereo speakers is a 12cm formed mica cone for bass, and the combination of these drivers plus the unit's physical volume allows the SH-ALL8 to create a big sound that couldn't quite challenge the Bluesound Pulse for scale and richness, but

certainly took on and beat the

Sonos Play:5 — yet it's only \$479.

The bass quality here is just what
we like — big but natural, rolling impressively deeply but managing not to bloat or
dominate the other frequencies. The treble

IN SUMMARY
Panasonic

SH-ALL8

wireless speaker Price: \$479

- + Great sound and size for the price
- + Wallmountable
- No Bluetooth/AirPlay

a strong and
unpinched midrange.

More than that, it creates a real picture
of the soundstage in the space around it. We
have nothing to say against it, and wouldn't

has real zing and

and vocals sound

clarity without

any edginess,

lovely through

were it priced at several hundred bucks
more. In sonic terms, this is a lovely
unit and a bargain. It can also be
wallmounted, as pictured
above (but will, of
course, require a
mains cable
to it).



SH-ALL3

f you have the space for the excellent SC-ALL8, then it's hardly worth saving the \$100 to go for the SC-ALL3. But if you don't have the space, we can recommend the smaller unit also. It's a big switch down in scale and bass when you go from one to the another, but on its own merits, and after after half an hour to shake the memory of its larger sibling, it becomes clear that the ALL3 is nicely balanced and indeed beautifully voiced, with a remarkably deep bass audible from below 50Hz and properly solid by 80Hz, so that bass guitars sound real and present, while the mids sing out loud and clear.

With the tweeters situated between the larger woofers, there's little sense of stereo available from the ALL3 (and of course none if you choose to have it standing vertically), but it's most certainly a musical box. Kd lang's The Air That I Breathe is a tough song to deliver, and the ALL3 didn't push the opening low bass forth as strong as it might (and as the ALL8 does), while her vocal was just a tiny bit reedy,

a tad short of lower-mid support,

but properly forward of the growing instrumentation, not at all harsh on IN SUMMARY

Panasonic SH-ALL3

wireless speaker Price: \$379

- + Musical sound
- + Good bass for the size
- + Vertical or horizontal
- No Bluetooth/AirPlay

the climactic choruses and, best of all, completely enjoyable and fully emotional. Although there's nothing much above 14kHz coming from the ALL3, the detail on the snare brushes was excellent, and the smoky atmosphere of this track thrillingly impacted. In a direct A-B with the same songs from a Sonos Play:3, this Panasonic unit sounded a mile ahead in musicality and tonal balance.

Another good speaker, then, only held back by the limitations of the AllPlay app.

The smallest ecosystem on test, with just two speakers and a unit to stream into an existing hi-fi. But AllPlay compatibility means you could add units from other AllPlay systems.

OVERALL VERDICT

Panasonic AllPlay

If you're reading these reviews in order, you may be spotting something of a pattern. This is the third wireless multiroom system where the speakers on the end of the system have performed admirably, and the streaming abilities may be in place, but the control system just hasn't run smoothly. Here there is reasonable filetype support, including for high-res files, and a pair of wonderful speaker units where about the worst thing we can say is that they don't have any direct streaming method via Bluetooth or AirPlay. But we found the AllPlay app rather basic and a bit flaky. But as we've said for Definitive Technology and LG, the apps can be fixed and updated. The sound, and the music, is forever. +

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Pure Jongo

The digital radio pioneer Pure was one of the first to release a family of multiroom products to rival Sonos. It's an attractive and versatile set of products.

ure became known in Australia as one of the key pioneers of digital radio, which it still is. But recognising a limit on the global expansion in that market, it was also quick out of the gate with a multiroom audio system of wireless players, and its own streaming music service too — though this service never quite made it through the licensing legals to

The system works well enough without that, and the range of players has expanded both in model count and in your ability to decorate, reorientate and, if desired, wall mount. It also boasts industry-leading synchronisation of 25 microseconds between speakers (HEOS boasts a similar figure), which becomes important when you pair units together to work in stereo. Most multiroom systems allow pairing of only one or two models in the range, whereas Jongo allows pairing of T2, T4 and T6 models — this last the biggest in the range, and pairing them

can make for a mighty performance indeed...

achieve launch in Australia.

tralia of is. But global it was room its own

PURE JONGO T2, T4, T6 \$199 / \$299 / \$399

Three sizes of wireless speaker units, with 20W, 50W and 100W of power respectively, all with Bluetooth and happy vertically or horizontally; the two smaller units can wall mount. Reviews: p60.

PURE JONGO A2 - \$149

A neat little puck of a hi-fi adaptor bringing the Jongo streaming abilities to any existing system, with digital and analogue outputs.

PURE JONGO S3 - \$299

An unusual portable design with five speakers, Wi-Fi for the home and Bluetooth for outside, 10-hour battery life and Jongo's usual wide range of colours. Review: p60. The lack of services and the poor if pretty app are overcome to some extent by the inclusion throughout the Jongo ecosystem of Bluetooth.

And no ordinary Bluetooth — Pure has Bluetooth Caskeid...

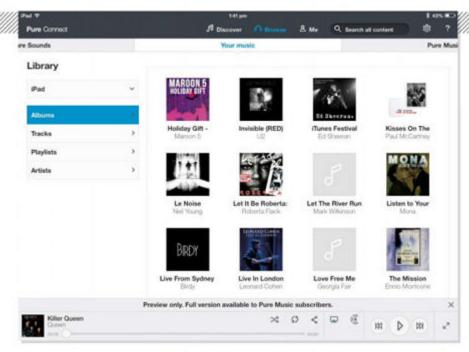
Meet the family

As shown on p57, the Jongo family includes three sizes of wireless speaker unit, in ascending order the T2 (25cm wide), T4 (30cm wide) and T6 (37cm wide), all of which can sit vertically or horizontally, all of which can be paired in stereo, and all of which have onboard Bluetooth for direct streaming as well as their network abilities. Pure has something special in Bluetooth which it calls Bluetooth Caskeid — this allows the unit receiving your Bluetooth stream to send this on to all the other Jongo units in your home i.e. multiroom from Bluetooth. This is unique among the systems tested here, which may share auxiliary inputs, but allow only single-unit Bluetooth streaming.

In addition to the three speaker units there is also the little S3 (13cm across and 13cm high), a portable unit which can be powered from its internal battery as well as from the mains. And there's the Jongo A2 Adaptor, which feeds the streaming parts of the Jongo app straight into an existing hi-fi.

As a potentially useful bonus to the family, Pure has so far made two of its networking digital radios compatible with the Jongo system, including the Pure One Flow and the Pure Evoke F4 with Bluetooth, an advanced digital radio which won our Sound+Image Award in 2014 for that category.





Browsing your music — the Pure app here shows albums on the controlling iPad itself. You can switch to network shares using the dropdown menu under the 'iPad' tab.

The app

The Pure Jongo app, well, it is superficially beautiful, with clever arrangements and good artwork. But we did find it one of the flakier in terms of pausing for thought rather than doing what you ask, and also in its general ergonomics of not making it easy to find what you want.

This is largely because it focuses on Pure's own streaming music service, which still isn't available in Australia after some three years of saying that it is imminent, so instead it offers only 30-second preview clips of anything you try to play. This service, thus curtailed if not strictly unavailable, nevertheless forms the heart of the app — the default 'Discover' area, and the 'Me' section as well, where you can set up preferences by creating a Pure account online. Under the 'Discover'/'Recommended' section (screengrabs right) we were presented with tailored music choices — Pink Floyd and Yes it offered us, so it had learned our preferences well. But selecting these took us to album screens where only those 30-second previews were available. So all these nicely-presented sections — 'Recommended', 'New for You', 'New music', 'Charts', and all three sections

under the 'Me' tab — they're effectively useless for Australian users.

Browsing and birdsong

That leaves the 'Browse' area as the one useful section of the Pure app for users here. Under this heading is 'Live Radio', which is a nicely designed internet radio section, with a separate section for 'on demand' podcasts, and an excellent "Similar stations" facility suggesting other stations like your current choice. Pure is also very good at keeping tabs on the quality of stations; using the website version of Pure's site you can

Setting Up Jongo...

Sad to report, we had a terrible time with set-up across multiple instances of using the Jongo system. You connect to the in-built Wi-Fi of one Jongo unit, then enter your Wi-Fi network details on a browser page, and if all is well, it connects, its front panel light turning solid green. For subsequent Jongo units, you press a small Wi-Fi button on the rear of the already connected Jongo, then the same on another, and they're supposed to pass the Wi-Fi information between themselves and then both are connected.

Most times this simply didn't work for us, and quite often it managed to disconnect the original Jongo in the process. Reconnecting to a half-working Jongo often proved time-consuming. Despite much running between rooms pressing Wi-Fi buttons, and several complete resets of everything, we had occasional success but often failure.

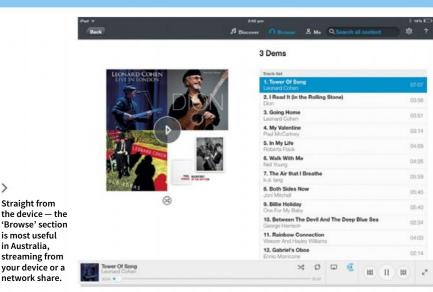
On one occasion we tried the simplest of set-ups — just an A2 playing into our hi-fi. It connected to the network perfectly, but then our Pure app claimed there were no compatible products on the network. Meanwhile the A2 had begun cycling its light through amber, red and green, which an online search (since there was nothing in the start-up guide to tell us) indicated that an update is in progress, which might take five minutes, but took slightly more. Then it became available on the app. But it was another frustrating set-up experience.

Ultimately we had plenty of time living with networked stereo T6s, a single T4 and the portable S3, and we used the A2 at the end of testing to take most of the screenshots shown here. But be aware that our listening notes for the T2 (and later in testing also the T4 and S3) were all made using their more reliable direct Bluetooth connection as we never successfully got them working on the network.

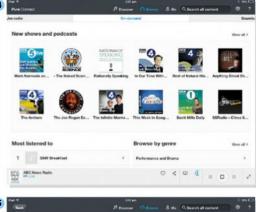
Navigation

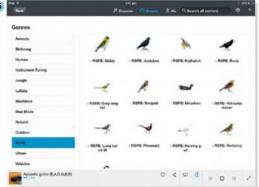
Lots of screens - mixed results

- 1 NEW FOR YOU: shows new releases that match your tastes
- 2 RECOMMENDED: combines recommendations of albums, radio stations and podcasts
- **3 ALBUM:** but both these two screens send you to Pure's Connect music streaming service, which is unavailable in Australia, so provides only 30-second track previews
- **4 ON-DEMAND**: for useful content in Australia, use the 'Browse' section. The 'On-demand' section shows newly available podcasts...
- **5 SOUNDS**: ...while the Pure Sounds section offers a great many background noises, including a whole RSPB section detailing birds and their calls



Rose for p





set up favourites based on the quality of their streams, which is sure to delight those seeking audio quality as well as quantity.

Also still unique to Pure is a 'Sounds' section, packed with babbling brooks and jungle background noises, and all manner of birdsong, including an RSPB section with the calls of some 50 specific species along with pictures and descriptions of the birds (bottom left screenshot)! There's an unexpected bonus. for twitchers.

At last, under 'Browse/Your Music' there's a section for playing your own device content or, via a drop-down, from network shares. This proved quite adept at getting through folder structures and playing our NAS-based tunes, though it could jam up if we confused it by changing tracks too often. It supports streaming of MP3, WMA and AAC files, no Apple Lossless or FLAC or high-res files, but we did find it able to handle CD-quality WAV files. Track control was sometimes flaky, even from music onboard the device itself — restarting a track often didn't work, for example.

On the upside, the hard buttons of the iPad did work to control volume, making rapid adjustment far easier than on some other systems. It also shows a timeline for songs with full scrub control, another essential missing from some other systems.

A particularly odd implementation is that every time you start up the app, even if you've done nothing since your last use, the Pure app disconnects from all the Jongo speakers. Tunes instead emerged through our iPad's little own speaker until we pressed the little Pure icon and chose a speaker to play through. No other system delays you in this way — they assume you'd like to play music like you did five minutes ago, or yesterday, which you most probably do want to do. Sometimes the app couldn't find our players at all for 10 or 20 seconds. Occasionally it wouldn't engage the speakers at all and we had to attempt repairing which, as our set-up comments indicate, wasn't easy.

The lack of services and the poor if pretty app are, however, overcome to some extent by the inclusion throughout the Jongo ecosystem of Bluetooth. And no ordinary Bluetooth — Pure has Bluetooth Caskeid, which links your Bluetooth to one Jongo and then through to all the other Jongos on your network if you so wish.

And of course with Bluetooth you can use whatever music app you like best in the ways with which you're already familiar. So, for example, we could use the native Deezer app to choose our tunes. Operation of playback this way was far preferable to using the dedicated Pure app itself.



Jongo reviews

tarting with the big fella, the 37cm-wide Jongo T6 uses twin full-range 5-inch drive units within its sturdy curvy plastic body, and a quoted 2×50 W RMS of power to drive them. Having two of them on hand we were able to try stereo-pairing them, and this creates a huge output — you can crank the pair of T6s most high without stress, with pumping bass and also in this configuration delivering proper stereo too. Overall there's a slight boxiness to the T6 sound, lacking the airy treble qualities of some of the better rivals, perhaps a result of it using only that pair of full-range drivers. At five inches diameter each they can push out some level while staying in control, but without dedicated tweeters, the quality of the treble response is inevitably limited. But then look at the price — at \$399 for the T6 you could have a stereo pair of them plus a third one for another room, and still have change from the price of a Bluesound Pulse.

At the other end of the size scale, the \$199 Jongo T2 is all about the treble and midrange, with very little in the way of bass. But the sound has size enough to be enjoyable — it is, for example, streets ahead of small handheld Bluetooth speakers, and given corner support to make the most of what lower frequencies it had, it was capable of a brightly-balanced sound for casual listening at moderate listening levels. But boom boom shake the room it isn't, and had we got it successfully networked (see set-up) we might have used the EQ settings to tame its top a little, as things got spitty towards the top of its volume range.

Remarkably the little \$299 Jongo S3 achieves much the same size of sound as the larger T2, but is less aggressive in the treble and its bass is a tad more believable, being less dominated in the mix. Its speaker arrangement is designed to be omni-directional, with four 19mm treble units firing every which way but backwards and a single upfiring 9cm mid-bass driver, so there's even less in the way of stereo than normal. But its trump card is that you have battery operation (quoted at up to 20 hours from the included ChargePAK) to carry the S3 around with you, which is a big bonus. It's a neat small room solution for those wanted a casual listening device.

Which leaves the **Jongo T4** speaker unit, also \$299, as our Goldilocks speaker in the Pure range. The T4 sounds perhaps more subtle than the T6, and its size is sufficient to bring some real but not emphatic bass to the balance, while its smaller drivers (here a pair of four-inch full-range cones) allow a lively and open but not abrasive top-end. Between these is a midband just slightly recessed but strong enough to hold up a thoroughly enjoyable whole. This would no doubt be further enhanced when paired for stereo, but we had only one.

Each unit has an auxiliary input and, as detailed in our app section, allows a Bluetooth connection to be shared with other Jongo units via Pure's Bluetooth Caskeid. Given the few services available in the app itself, this is perhaps the Jongo's system's most useful attribute.

There are also wall-mounts for the smaller T2 and T4 speakers, and a table stand for the larger T6, all of which can operate in either horizontal or vertical orientation.

The colourful options of the Jongo range are available via



OVERALL VERDICT

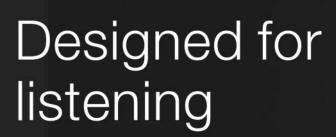
Pure Jongo

Our Jongo experience was not all joy and light, but the T4 is a good-sounding unit, the S3 a handy little portable, and you can certainly have a party with a stereo-paired brace of T6s. The prices are very competitive and the range is wide, especially with some of Pure's radio-based products added into the Jongo ecosystem. And the Bluetooth is excellent, including Pure's multiroom-extending Bluetooth Caskeid.

But the speaker units do not have the most sophisticated sound quality when heard among their competitors, and the app is of limited use in Australia without the availability of the Pure Music service which dominates the app. And if you end up just using Bluetooth from random apps, why limit yourself to a single family of speakers?

Pure was one of the first to produce a Sonos-challenging system, and there's much here to its credit, particularly the industry-leading (with HEOS) synchronisation times and the tech behind the whole thing. But the latest competitors are delivering more hi-fi-sounding speakers, along with apps that offer multiple services and interfaces more suitable to our local market. Again, a reworked (and locally relevant) app could do much to improve things.

Bowers & Wilkins



The **ALL-NEW CM Series** loudspeakers are undoubtedly beautiful, capable of gracing any room with their clean lines and high-quality finishes. But as with all Bowers & Wilkins loudspeakers form must follow function, and thanks to our Decoupled Double Domes and tweeter-on-top technology you wont believe how beautiful your music can sound.

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Decoupled Double Dome tweeter

ff/BowersWilkinsAu



onos has enjoyed amazing success since it launched its streaming multiroom-capable products more than a decade ago. At first there were just the original versions of what are now the Connect and the Connect: Amp, then called the ZonePlayer 80 and 100, streaming either into an existing hi-fi or with internal amps as a just-add-speakers solution. Looking back at our past review notes it's remarkable to find that its first standalone speaker unit, the S5 (now the Play:5), got its first Sound+Image review in 2009, since when a Play:3 and Play:1 have arrived, plus the Playbar soundbar with its Sub subwoofer. And there the hardware range has stuck for a while, the only recent changes being a refreshed app design (which managed to disenchant enough users that a re-refreshed

for a while, the only recent changes being a refreshed app design (which managed to disenchant enough users that a re-refreshed app was rapidly rolled out, in early February this year), and also ever-evolving offerings within that app. We were able to try one of the newest — the ""Hi-Def" Deezer Elite streaming service — during this review.

The company's Apple-like sense of design is instantly attractive, and its best products have solid audio sensibilities. That 2009 review of the S5 was quite the rave — "there's nothing at the price that sounds better", we gushed. But that was then, and this is now.

The intervening years have seen the release of endless wireless speaker docks, and now of course we have all these competitors, multiroom systems that directly challenge the Sonos incumbancy. It may now be a household word, but is it still competitive? Is anything better than Sonos?

Meet the family

Aside from the discontinuation of the Bridge and its replacement by the Boost, the Sonos ecosystem has remained unchanged in hardware terms for some years. That's not necessarily a bad thing, of course — if you have the perfect system, why mess with it!

So there remain three sizes of standalone wireless speaker — the Play:5, the Play:3 and the Play:1. There is the Playbar soundbar, and the Sonos Sub which was introduced at the same time to be paired for home cinema use, but which can also operate to provide extra bass ("soul-stirring bass" says Sonos) for any of the Sonos speaker range.

The three electronics units are now the Boost (to boost Wi-Fi or create Sonos' own mesh network), the Connect, which plugs into an input on an existing hi-fi system to bring Sonos abilities to any system, and the Connect:Amp, which is the 'just-add-speakers' solution of the Sonos family.



The middle size in Sonos' wireless speaker range, the Play:3 is 27cm long (but can also sit upright) and uses three active drivers plus a bass radiator.
Two Play:3s can be paired in stereo with or without a Sub, or can work as surrounds with the Sonos Playbar.

SONOS PLAY:1 - \$329

The entry-level speaker unit for Sonos, operating in mono with one tweeter and one mid-woofer in a unit 16cm high. Can be stereo paired, used with the Sub or as surrounds for the Playbar.

SONOS PLAYBAR - \$1099

SONOS

SONOS SUB - \$1099

when the Sub is present.

This wireless subwoofer unit can be

used for home cinema in conjunction

with the Playbar, but can also be used

to deepen the performance of the other

wireless speakers. The Sonos system adjusts its EO settings automatically

The soundbar solution of the Sonos family can be used on its own, with the Sonos Sub to add more bass, or with the Sub and a pair of Play:3 or Play:1 speakers to take surround duties in a true surround system. It shares all the usual Sonos streaming abilities in addition to extra inputs for use with a TV.

SONOS PLAY:5 - \$649

The largest of the three Sonos standalone wireless speakers is a former Sound+Image Award winner, containing five drivers and offering an auxiliary input, headphone output and two useful Ethernet sockets. It can be paired for stereo. Review: p65.

SONOS BOOST - \$160 SONOS CONNECT - \$599 SONOS CONNECT: AMP - \$849

The Boost is a Wi-Fi signal booster and can also do the former Bridge's job of creating a separate mesh network just for Sonos. The Connect offers analogue or digital outputs to a hi-fi, while the Connect:Amp is the system's 'just-add-speakers' solution.

wireless multiroom

Setting Up Sonos...

One of the impressive solutions Sonos delivered when it first launched was that it creates its own wireless 'mesh', as the company calls it, so that it doesn't rely on your home Wi-Fi network. You give any one Sonos unit a wired Ethernet connection to your router for a connection to the internet, then the Sonos mesh links with all the other players.

This is far more reliable than dealing with the unknowns of different routers and changing Wi-Fi standards. But when the first competitors came along that were able to use a normal home Wi-Fi network, Sonos changed its software so that Sonos can now use a home Wi-Fi network instead — nullifying any advantage claimed by competitors.

Either way, you follow instructions from the app which involves pressing two of the three buttons on the top of each Sonos unit to connect into the system. Updates are generally installed at the same time, so there's a bit of waiting, but the indicator lights and messages in the app keep you informed of what's going on, and it has always proved a reliable system in our many times using Sonos.



Press 'mute' and 'volume up' together to get each Sonos unit connecting up to the rest of the family. It's fairly quick, and reliable.

But as many a custom installer has told us, stick to the Sonos mesh if you can! If that first Ethernet connection is difficult, you can buy a Sonos Boost (the cheaper Bridge is just being discontinued) to sit by your router as the start point for your mesh.

This also delivers a bonus which to our knowledge no competitor has copied and even Sonos doesn't bother much promoting. Most of the Sonos products include one or two Ethernet sockets on the back. Even if the unit is connected by Wi-Fi to the Sonos mesh, these sockets can deliver internet to other connected devices. This can be useful for feeding Ethernet networking to a nearby TV or PVR or AV receiver, and the data bridge has saved us long runs of cable on many occasions.





The main Sonos 'Now Playing' screen, showing current track and the songs in your queue. Tapping the top left brings up the Navigation tab (right), tapping the room name at the top allows multiroom grouping.

For this review we returned to the Play:5 and Play:3 units, and also loaned a Connect so that we could judge the quality of Deezer Elite (see p66) through our reference system.

Sonos – the app

In the early days of Sonos, you ran software on PC or Mac to set things up, involving a bit of running around between the computer and wherever your Sonos players were situated. You also used a dedicated Sonos controller to navigate the system. But the rise of smartphones and tablets made that redundant, nice as it was, and allows you to visit each Sonos unit with your smart device, so no more running around is required either.

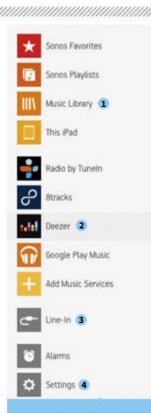
The Sonos app was long its great strength, an easy interface combining music on your device or computer, on the network, and on the internet. But as the years went by and music providers became more common and had their

As apps go, Sonos has one of the best, and certainly has the widest profusion of services — some subscription, some free. We quickly added Deezer and Google play...

own very nice apps, the closed world of the Sonos app began to feel more restrictive. And that's still the case — if you have a preferred music service that is not part of the Sonos world, bad luck — there's no Bluetooth here to allow any app to send audio to the Sonos system, other than by using an auxiliary input with an external device. Or if you prefer the interface of TuneIn internet radio's own app to the version within Sonos, again bad luck, you can only use the Sonos version.

There again as apps go, it's one of the best, and certainly has the widest profusion of services available — some subscription, some free. We quickly added our Deezer account and Google play (we use the free Google play storage for 20,000 songs, not the paid access), and we signed up for and tried 8tracks, a free service of curated short playlists. There's plenty here to keep you playing and to introduce you to new music, one of the great joys of all internet music services.

As for music shared on the network, this didn't prove so easy. Under Settings in the app, there's a 'Manage Music Library' tab, and Music Library Setup. But whereas most competitors then take a look around the network and show you the available shares, the Sonos app showed no selections, and invited us to type in "Path \\computer\ sharename". Your friendly custom installer may work this out in a jiffy, but most consumers will not. Yet we remembered from previous reviews Sonos had dealt wonderfully easily with our iTunes collection. Back then, of course, we had been using the computer-based software. So we went to our main music computer and got that installed, and sure enough, this proved a far better way to add networked content. The program (which retains the look of the old Sonos app, so may be due an update soon) actively asked to add our iTunes music library to the Sonos



Navigation

Sonos keeps its Navigation panel readily available by tapping the top left of the main screen.

- 1 MUSIC LIBRARY takes you to shared network folders. including NAS drives and iTunes collections. We found iTunes shares were most reliably added using the dedicated Sonos software for Mac/PC, and we experienced some issues adding the NAS drives on our network to the Sonos system.
- 2 DEEZER and a wealth of music services (see right) are available from within the Sonos app. Without Bluetooth. there's no way to use the native apps for these services, nor to stream services that aren't available within the Sonos app. But in recent years Sonos has made efforts to make its own app implementations more attractive and user-friendly, and it has locked in the CD-quality Deezer Elite streaming for the next year as a 'Sonos-only' offering (see p66).
- **3 LINE IN** allows playback from the auxiliary input, which can be shared to other Sonos devices.
- 4 SETTINGS are impressively comprehensive in Sonos, developed with a decade of feedback from users. They include setting up your Music Library, registering your product, changing the pairing or surround set-up and far more. Alarms are handled under a separate menu.

Music Library. We selected the relevant folder (which is on an attached Thunderbolt drive) and the program froze up for a while, most likely in alarm at the 30,000+ tracks in there, but eventually showed via a twirling star icon that it was updating the library. Clearly your computer must be on for the Sonos system to play the music stored there.

We could add other shares while the twirling was happening, but Sonos refused to add our actual Music folder on the Mac (we had to direct it to the iTunes folder itself. hoping Sonos would pick up our extensive iTunes playlists, which it did. This level of iTunes integration even when the music files themselves are outside the Music folder seems uniquely effective among these systems).

For NAS drives the Mac-based software reverted to asking for a path, rather than allowing us to browse the network to find it, and Sonos needs CIFS/SMB sharing, which most NAS drives support (or can be set up to support). Despite trying every path variant we could concoct, and having one NAS drive which adhered perfectly to an example on the Sonos website, we never managed to get either of our music drives to talk with Sonos.

Formats proved to be well supported up to CD quality — MP3, WMA, Ogg and AAC (but not 48kHz AAC), also Apple Lossless and FLAC up to CD quality, but not beyond. There is file support for AIFF and WAV, but not from iTunes, and Sonos specifically suggests you switch these files to FLAC or Apple Lossless, partly for the better metadata support which it needs to accurately index everything. There is no support whatever for high-res audio (by which we mean above CD quality) at this time, and Sonos tells us there isn't likely to be — it just isn't on their radar. Even if you join Sonos in being dubious about the merits of high-res audio, it's a disappointment that any high-res files you have acquired simply can't be played. We did miss the easy ability to scroll through our growing high-res audio collection, as we did on, for example, the Bluesound system.

Otherwise we found the app highly enjoyable to use, with alphabetical jumplists for getting around long lists of artists or tracks, and good use of album artwork where available. The hard volume buttons on the side of our iPad worked to control whichever Sonos unit was selected in the app.

wireless multiroom



So many streams - some are more useful than others, but the Sonos selection of services is certainly second to none.

For playback, Sonos uses a queue system, so you browse around and add tracks or album to the playlist, each time offered the choice of 'Play now', 'Play next', 'Add to Queue' or 'Replace queue' — this last useful (and not yet common elsewhere) for clearing out a bloated queue of who knows what. You can also clear, edit and save the queue easily from the main playback pane on the right of the app. We put the app equal first with Bluesound for ease and pleasure of use, though navigation of the Sonos app can involve more backing up to get to your original list of music sources. Sonos has worked in recent times to make third-party streaming services more attractively presented within its own environment even so, some sources, such as Google play, are far prettier to use in their own apps, and these have to be abandoned when you enter the Sonos walled garden. +



PC & MAC SOFTWARE

The dedicated software for Mac and PC allows control of your whole Sonos system without resort to smartphone or tablet, and we found it also assisted the reliable serving of iTunes collections and music shares.



Sonos Play:5

othing much seems to have changed on the Play:5 since we first took it home in 2009 as the S5 ZonePlayer. It presents an unobtrusive grey grille with your choice of black or white body, with just those classic Sonos controls on the top — mute, volume up and down. Its driver count includes true stereo from twin tweeters and three-inch midrange drivers, with a single active 3.5-inch 'subwoofer', all drivers being powered by their own Class-D amplification. As with the other Sonos standalone speaker units, you can stereo pair two Play:5 units to achieve additional power and a wider stereo spread.

On the back are those two very useful Ethernet sockets, an auxiliary minjack input which can be shared with other Sonos units, and a headphone output.

As mentioned earlier, the Play:5 got a rave from us for its sound quality when it came out back in 2009. It remains capable, but is no longer in the top rank of standalone speaker units, with some of the true hi-fi companies proving their advantages in providing more musical performance. In particular there's is less depth to the Play:5 than from units from HEOS, Definitive Technology, Bose or Bluesound, some of which have, of course, chosen to offer larger and more expensive offerings to take their systems

to another level. In direct comparison the Play:5 has a little boxiness, some spit to its treble, and a tight but not deep bass. It comes with 'Loudness' activated by default under the EQ options, which also provide sliders for bass, treble and balance. We upped the bass a bit for use in a freestanding position, and the unit can throw out some level and thump, for sure, but it is not a beguiling musical listen — the six years since this design appeared have been a wild and busy time for developers of wireless speakers, and it's an interesting lesson in how far one-box systems have come.

The Sonos control system is still great, and we might still deem the Play:5 competitive were it closer to its US price of US\$399, but at the Australian price there are now more musical competitors with better hi-fi qualities.

IN SUMMARY

Sonos Play:5

wireless speaker Price: \$649

- + Good if not exceptional performance
- + Sonos app still a goodie
- + Useful Ethernet sockets
- Competitors now have the sonic edge
- Pric



One of the launch graphics for Deezer Elite. But Deezer isn't 'Hi-Def' as we understand it, and is Sonos really the best delivery for 'hi-fi'?

Deezer Elite...

Deezer has given Sonos a 12-month exclusive on its new CD-quality streaming service Deezer Elite, which launched here in Australia in mid-March. The higher-resolution service will only be available for playback through Sonos systems and the Sonos app – with the sole exception that it will also play from browsers on computer, so you could purchase a subscription for playback from computer through, say, a USB DAC and into a hi-fi, without the need for any Sonos gear.

Though it's not cheap, Deezer Elite looks to be the best streaming option around. Its entire 35-million song collection (Spotify currently claims 30 million) is available to stream as lossless CD-quality FLAC, 'unzipping' to full 16-bit/44.1kHz files at 1411kbps. The lossless compression of FLAC will allow the actual data to stream between 600-800kbps.

We have spent nearly a month with Elite playing through own reference system, and in A-B switching between our own CD rips and Deezer Elite, we couldn't pick a difference. It is the real deal.

We were told at the Sydney launch that by buying a full year subscription in advance. you could get Deezer Elite at the same price as the current Premium+ casual rate of \$11.99 per month. For month-by-month subscribers there would be "a premium", they said. But when pricing was released, it emerged that the annual deal is for the first year only. If you pay the \$143.88 and do not cancel your subscription, then 12 months later you will be charged "the standard rate" of \$287.88 per year, which is \$23.99 a month. This turns out to match exactly the local pricing for Tidal's CD-quality streaming which launched only weeks later. Playing through a Play:5, Play:3 or Playbar, we wouldn't say the gain in quality for Deezer Elite is worth the higher price. Through a Sonos Connect (or a USB DAC) into a good hi-fi you can certainly hear the difference, so then you have to weigh up the full doubling of the price over the normal 320k stream (see p8).

We also note that Deezer is using 'Hi-Def' and 'HIGH DEFINITION AUDIO' to describe its CD-quality streams. 'High definition' here is used as a comparison with MP3s, and while we acknowledge that others are now defining high-res or high-definition audio in this way, we still prefer to define high-res audio as anything above CD quality, and not including CD quality. As for Deezer's use of the phrases "Enjoy the best music experience ever created for the home", and "Enjoy music the way it was created", we'll leave our readers to make their own assessments of accuracy there. Jez Ford



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Stewart





Sonos Play:3

he Play:3 is our favourite of the Sonos standalone speaker units — it's neatly compact at 27cm wide and 13cm high, but uses its 16cm depth to maintain just as enjoyable a balance as the larger Play:5, and a good bit of level without distress. The treble is still a little splashy, but the midrange projects well, and you don't expect the bass to go too low from a unit this size, so you miss it less than on the larger unit — it doesn't have a dedicated bass driver, just twin tweeters and 76mm midrange/ bass drivers, and some bass notes clearly enjoyed preferential support from this combo plus the rear passive radiator, but overall it's enough to achieve an enjoyable balance with a hint of hi-fi. There's no auxiliary input or headphone socket here, but still one Ethernet socket, so if it's working on the Sonos mesh

network this can usefully pass an internet connection to other equipment.

We did have a second Play:3 to hand, so were able to try it in stereo paired mode — this is where synchronisation comes into play and Sonos is not as fast as either HEOS or Pure, so the imaging is potentially less effective, but from units of this size well separated to achieve a good stereo effect, we couldn't detect any damage or deficiency. You can also flip them vertically if you don't mind the logos going sideways and a slight loss in bass performance. Going stereo is quite a step up in size of presentation (at double the price, of course), and two Play:3 units can double in duties with a Sonos Playbar and Sub to create a TV surround system.

A good and versatile performer, then, if now looking a little pricey in Australia compared with competitor units like those from LG and Panasonic.

OVERALL VERDICT: Sonos...

Sonos has a great app for its control system, and by far the best collection of online sources within its app, thanks to its long evolution and extensive partnerships. But it doesn't have the most musical performers in terms of speaker units, and it doesn't have any way (such as Bluetooth or AirPlay) to easily use music apps that are outside of the Sonos ecosystem, other than plugging stuff into an auxiliary input.

That means there is still much to recommend Sonos if you're using its Connect receivers plugged into a separate hi-fi system (we'd recommend using the digital output into a good DAC to get the most from CD-quality files and Deezer Elite). Adding good active speakers to a Connect would be another way to get the most from Sonos.

If, however, you're looking for a whole multiroom system using a mix of the standalone wireless speaker units, and if sound quality is high on your priority list, then there are now better sonic performers from competing systems. +



One advantage of Sonos being so established is that other companies are providing accessories. Flexson offers various stand options for Sonos speakers, and these 'Colourskins' which brighten the Sonos designs from their standard black and white.





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Conclusions

o, after months of living with these eight wireless multiroom systems, what have we learned? Our first conclusion is that whatever level of hi-fi you're buying, it makes sense to think multiroom from the start. If you're happy with an existing conventional hi-fi, one of the receiver units can add online sources and network file streaming, and provide the foundation to add a bedroom or study speaker unit later that will link neatly into your existing system. If it's wireless speakers you're after anyway, well, these systems offer as good as any available, and again provide the basis for an expanding system.

As for which to pick, there is a certain amount of 'horses for courses' depending on various questions. If you're into high-res audio (by which we mean above CD quality), or if you have a lot of music in FLAC, or AAC or Apple Lossless, you'll need to pick a system that will service your existing music (or face a lot of file conversion). If you have no music collection at all and just want to live in the land of Spotify and Pandora, then the way the different apps present those services will be vital to you. If you want to stream from your device by Bluetooth, you need a system that can handle that. Putting together those abilities you need

and matching them to our reviews, you may find your choice becomes narrowed down pretty quickly.

Several systems delivered excellent hardware but under-developed apps — and surprisingly, two of them did so despite using a third-party app provider. It's worth remembering, however, that apps can be improved, while the hardware and the sound quality are more fixed quantites. So if those systems otherwise seem a match for your needs, you might reasonably take a punt on their future app upgrades fixing many apparent issues.

But for our money, there was a definite winner here, for its combination of high-quality app, file compatibility, online services and an excellent wireless speaker sound quality. Bluesound was the one system that did everything right. Its Node upgrades an existing hi-fi system, its Pulse is a fantastic speaker unit (at a price, of course — unfortunately the upcoming Pulse Mini hadn't surfaced in time to be assessed for this review).

While Sonos certainly delivers the app, the online services and a solid connection system, its sound quality was noticably behind many of its rivals, and it can't handle high-res audio files. So in answer to the question 'Is anything better than Sonos?', our answer would be yes. Bluesound is better than Sonos. +

What we were looking for, and what we found...

SOUND QUALITY

It's great news that many of the wireless speakers here are the best wireless speakers we've ever enjoyed. The Bluesound Pulse and the Definitive Technology W9 were our two favourites at the top level, but there were a great many high-value units further down — the HEOS 5, the W7, both Panasonics and the LG H7. All these should delight any one who owns them in terms of delivering the music.

THE APP & EASE OF USE

Ease of use for these systems proved to be largely down to the app, plus the services and formats supported (see below). There are two clear leaders for the quality of their apps — Bluesound and Sonos. Both these feel professional, look attractive, and make good choices at getting you to the music quickly. Several others make a merit of their relative simplicity — HEOS, and Bose in particular, the SoundTouch offering proving number one for rapid 'time to music', with its preset buttons and conventional remote controls proving hugely useful. Some of the others were painfully simple, and we hope they get upgraded to make the most of the fine audio quality some of them can offer.

SERVICES & FORMATS

See the individual reviews for which formats and online services are included — make sure your current music collection can be handled; it's a huge disappointment if it isn't.

SYNCHRONISATION

The ability of multiple speaker units to play tightly in sync proved to be only of importance when stereo pairing or creating a surround system from those that offer a soundbar. If all your speakers will be in separate rooms, sync times simply aren't of any relevance.

WIDER COMPATIBILITY

While some of these systems belong to a wider platform, the benefit of this depends on many other brands joining the platform, and on the app for the platform being a good 'un. Neither DTS Play-Fi or Qualcomm's AllPlay managed to impress us much in these regards, but if the apps are improved and the platform expanded, it's potentially a future benefit.

EXTRAS

Having a direct streaming method via Bluetooth or AirPlay did prove a major benefit, so bonus points there to Bose, LG, Pure, and (if you add an adaptor) Bluesound. Jongo scores double here for Bluetooth Caskeid which is shared to other players across the network. Other handy extras were Bose's inclusion of traditional remote controls, and the inclusion of PC and Mac control software (Bluesound, Bose, Sonos and PC-audio sending for Definitive Technology). Good local control buttons also proved well worth having.





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High Life

Denon AVR-X4100W

With seven amps.
11 pairs of speaker outputs and
13.2 preouts, this Denon is ready for the new breed of height-enhanced surround sound, including Dolby Atmos and Auro-3D...

he first of our two receivers this issue is Denon's AVR-X4100W, and it's the model which picked up a Highly Commended in this price category for our 2015 awards. While it was pipped at the post by the Yamaha receiver also in this issue, there are reasons why you may yourself prefer the Denon, or find it more suitable to your uses. But one thing they have in common is the hottest new home theatre thing in town — Dolby Atmos. As if 7.2 channels weren't enough, Dolby Atmos is promising quite a few more, along with discrete content for those extra channels. And Denon is here to deliver it.

SUMMARY

Denon AVR-X4100W

AV receiver Price: \$2499

- + Top notch home theatre performance
- + Very good video handling
- + Built in WiFi and Bluetooth
- Some early HDMI 2.0 wobbles

Equipment

The receiver has seven amplifiers, each rated at 125W output into eight ohms measured under hi-fi criteria. Each can support loudspeakers of four ohms nominal impedance (you choose 4, 6 or 8 ohms using a special set-up menu, so no additional power is available at the lower impedances). You can apply two of the amplifiers to this, that or the other thing — they can bi-amp the front speaker pair, power a second zone, mono-amp a second and third zone, and so on. They can power front height speakers for Dolby Pro Logic IIz, or a

pair of ceiling speakers for Dolby Atmos. There are lots of options, and 11 pairs of speaker binding posts mean that you can have more than one of the options wired in permanently.

There are also 13.2 channels of preamplifier outputs. Some of the many output modes, including two of the three Dolby Atmos ones, require additional amplifiers. The .2 is justified here because there is a degree of independent support for two subwoofers. While they cannot be divided into left and right or front and back units, the receiver does allow the setting of separate distances to ensure they are time aligned.

Lots of other connectivity is provided, with plenty of analogue inputs, including moving magnet phono for a turntable, and eight HDMI inputs, one on the front panel. There are two HDMI outputs for the main zone, and a third for an extra zone. There are also line audio outputs for Zones 2 and 3, and composite video and assignable component video for

Built in are both Wi-Fi and Bluetooth. You can stream audio from just about all your portable devices direct to this receiver, whether by AirPlay, DLNA or Bluetooth. For Bluetooth the SBC and AAC codecs are supported, but not aptX. There's also a USB socket on the

The Denon's 4K upscaling applied a noticeable amount of picture sharpening while doing so, producing thin halos around elements of the test pattern.
There seemed no way to defeat this.

20 20

And there's more



The main 'rival' to Dolby Atmos is Auro-3D, and Denon's top receivers also have an upgrade available for that — though at a price of 149 Euro. If you follow the links from www.denon.com.au you are led to an area with European pricing and notes that this is a Europe-only upgrade. Denon's Australian distributor QualiFi explained to us that only two markets were initially supported for the Auro-3D upgrade: North America and Europe. After QualiFi contacted Denon, "requesting that we would like to offer the Auro 3D upgrade service in our market as well, as we have a fair share of high-end AV enthusiasts too", Denon worked out a solution to enable Australia to 'attach' itself to the European upgrade service. The only caveat is that customers do need a PayPal account to pay for the Auro 3D upgrade; Denon is working on a more permanent local solution for our region. The Auro 3D upgrade is a user-cost upgrade in every market in the world.

front panel. This supports mass storage devices, plus iPods and iPhones. In addition to music you can use this USB to display photos. But you won't want to, because the picture quality from photos is terrible.

AM radio is back, after being missing for some years from Denon gear. Of course, AM sounds horrible on a high quality system, but its absence left such things as talk radio inaccessible for Denon owners, except via internet radio.

Dolby Atmos consists of two parts. Part relates to its internal operation, and the other part relates to its delivery. The system supports 7.1 'bed' channels, just like any discrete 7.1 channel system, but adds up to 128 'objects'. An object might be a bullet whizzing from front left, overhead to rear right. It is held separately and is accompanied with data specifying where it ought to be located at every instant.

It is only at the delivery point that this is mixed into the rest of the sound,

optimised to deliver the best sense of location with the installed speakers, whatever they may be. It's all very clever, and will work with Blu-ray because Dolby TrueHD and Dolby Digital Plus include room for 'extensions' which are ignored by devices that don't understand the new format.

Dolby Atmos is designed to work as well as possible in whatever the circumstances of the delivery end. What this receiver offers in terms of playback options are 5.1.2, 5.1.4 or 7.1.2 (see our Atmos feature for the full explanation of the different standards — but basically 5.1.2 is normal 5.1 plus two ceiling speakers, etc.). Denon's bigger AVR-X5200W adds 7.1.4 and 9.1.2.

Subsequent to our review, Denon has announced that the X4100W and the higher models will also be upgradeable to Atmos rival Auro-3D, though at user cost (see panel).

Performance

A wizard talks you through setting up the system. A very detailed one, if you let it, it will even tell you how to place and connect your loudspeakers. It switches off the amp output state during this part, for obvious reasons. Again, this is highly detailed (a three-step process with an animation showing you how to strip the speaker cables), but you can skip the various stages you feel you don't need.

The Audyssey MULTEQ XT 32 processing requires the use of at least

SPEAKER SOCKETS

11 pairs of speaker binding posts mean you can have more than one of the amplifier options wired in permanently. 13.2 channels of preamplifier outputs allow additional amplification to be added for larger surround set-ups, including those for the new heightenhanced Dolby Atmos and Auro-3D.

PRE OUTS

нрмі

There are eight HDMI inputs (one on the front) and three outputs, including Zone 2 video and a monitor feed.





Dropping the front flap shows the local control buttons as well as the useful ad hoc connections available there... one HDMI input, a USB slot, an old-style composite video plus audio input, the socket for the set-up[microphone, and a headphone output.

"As for Atmos,
I'd venture to
suggest this is
the first really
worthy addition
to home theatre
audio since Dolby
TrueHD and DTSHD Master Audio"

three different measurement points in the room: the prime seat and a couple of close positions. If you have the patience, and the concern for others who might be sharing your listening room, you can add plenty more. A cardboard stand can hold the calibration microphone.

The system properly detected and calibrated my speakers, setting them all to 'Small', although the crossovers were all over the place: 40Hz for the front, 60Hz for the centre, and 150Hz for the surround. All the speakers are similar in their bass competence. As always, check the results of the auto set-up and make appropriate adjustments.

As for audio processing: hallelujah, Denon has seen the light! For some years Denon's receivers applied Audyssey Dynamic Volume (an adaptive dynamic range processor) and Audyssey Dynamic EQ (an adaptive 'Loudness' control). The former might have its uses, but Denon applied them *automatically*. Without asking. Without telling you. Last year I was pleased to report that this model's predecessor had changed to the extent giving you a choice about Dynamic Volume at the end of the set-up. With the present unit there was no option for Dynamic Volume, but there was one for

Audyssey Dynamic EQ. (Which I chose to leave switched off, of course.) After the set-up was finished I went straight into the Setup Menu and discovered that Dynamic Volume was also off. Hooray! That's a win for audio quality.

Look, they are there if you want them.
Dynamic Volume can be, in fact, quite useful if you find yourself having to watch a movie at low volume. Dynamic EQ, though, is in my view based upon a complete misunderstanding of how the human listening mechanisms (i.e. those in the brain as well as the ears) work.

The wizard also helps you through establishing a network connection. You can set up Wi-Fi the usual ways, with WPS or scanning of access points and entering passwords. Or you can plug your iOS device into the receiver's USB and follow instructions. Or, and this is the one I used, you can use your iOS device's settings to find the Denon receiver, select it, and then wait a moment while it transfers the settings to the receiver so it joins the same wireless access point (2.4GHz only) and then returns your iOS device to its original connection. Easy. There is, of course, app control from smart devices available for the Denon X4100W, which simplifies many areas of receiver operation. But there's no substitute for the traditional remote when you just need to nudge up that volume...



One other thing (as if all that isn't enough) about the set-up. There's some interesting stuff buried amongst the menus. If you love stereo music, go into Speakers/Manual Setup and go the bottom of the list, called '2ch Playback'. There you can make adjustments to the set-up of the front stereo pair for when you're playing stereo. Tweak the crossover frequency to the subwoofer, or the speaker distances or their respective levels. Indeed, you can get rid of the subwoofer entirely for stereo music if you like. This won't affect them when they're working on surround sound. What a clever idea!

I'm not going to say much about the sound because, after all, we're talking Denon. In short, it sounded first class, with excellent surround and stereo sound, utterly competent handling of crossovers and such, and fine control over the loudspeakers. I tried some full-range front stereo speakers too, since these present a greater control and power challenge to amplifiers, and again the results were wonderful.

And then there's Dolby Atmos.
Unlike Dolby Pro Logic IIz with its
'height' speakers, Atmos doesn't guess at
the additional information — it works
on actual designed signals. That requires
Blu-ray discs with Atmos encoding.
Those discs are only just appearing on
the market — see our separate feature
(p81) for details of our Atmos listening
experiences.

There has also been a shift with regard to Dolby Pro Logic. Nowhere in the manual is it mentioned, nor is it available in the surround option list, at least under that name. It seems that Pro Logic (the original four-channel innovation), Pro Logic II (separate, full range surround channels), Pro Logic IIx (added surround back) and Pro Logic IIz (front height) have been replaced with



Dolby Surround. This seems to bundle all that went before into one system that uses all the speakers you have available. [From the manual: "This mode uses Dolby Surround Upmixer to extend various sources to natural and realistic multi channels for playback. Use ceiling speakers such as top middle speakers to realize a three-dimensional sound field."]

There are also a bunch of DTS processing modes and Audyssey DSX if you want to try different ways of expanding the number of original channels of sound.

Denon has been pretty strong on video handling of late, and this receiver is no exception. It will scale any video input up to as high as you like, even to 4K at 50Hz or 60Hz if that's required. Its deinterlacing is automatic, but extremely good with both 576i/50 DVDs and 1080i/50 Blu-ray (and, by extension, 1080i/50 HD TV). Very occasionally it could be tricked by my test clips for the briefest instant. So I'd prefer a force-film mode, but if you don't want to manually intervene, you're not going to find better than this.

There were some 4K wrinkles, though. I wouldn't recommend using the 4K upscaling capability of the receiver for the usual reasons of letting the 4K display do its own stuff, but also because this receiver applied a noticeable amount of picture sharpening while doing so, producing thin halos around elements of the test pattern I used. There was no way to defeat this. In addition a Beyonwiz T3 PVR lost audio when this receiver was plugged into the HDMI input of two different 4K TVs with 4:4:4 colour support. Also, there was no image or sound available if HDMI OUT 1 of an Oppo BDP-103AU Blu-ray player was set to deliver 4K output and the material playing had the normal frame rate of 23.976. However this didn't apply to HDMI 2 from the Oppo, nor to output from HDMI Out 1 at 2160p/60, 2160p/50 or, indeed, 2160p/24, where the 24 was 24.000 rather than 23.976. All this had been drawn to the relevant equipment makers' attention, and I expect that these incompatibilities will be eliminated in short order with firmware upgrades.

Having Bluetooth built in makes for a better experience than a dongle. For one thing the receiver can display track information on the connected TV (although not cover art) along with the name of the device which is connected. It also provides a pop-up Option menu, from which you can choose repeat or random play, adjust the tone or set the channel levels. Two particularly useful

options there are 'All Zone Stereo', which sends the music to all the connected zones, and Video Select, so that you can run video from a different source while your music is playing.

The Option menu does not include a switch for the 'Restorer' function which purports return some of the material lost in compression. That defaults to 'Low' for Bluetooth. But you can pop up the Setup menu (look in the Audio section of this) to switch it off. Even at 'Low' this feature added an unfortunate brashness to the sound.

Better quality may be available via network audio or devices plugged into the USB socket, depending on the codec in which they are stored. Both the network and USB handled all my regular content — MP3, WMA, AAC, Apple Lossless (at 96kHz), and for two channels at up to 192kHz, FLAC, WAV and AIFF. It adds two-channel DSD at 2.8MHz, but not at the rarer 5.6MHz. The file support is the same from the network (though I couldn't test DSD since my server won't serve that).

Conclusion

The Denon AVR-X4100W is a fine home theatre receiver with excellent facilities and excellent sound quality. As for Atmos, I'd venture to suggest this is the first really worthy addition to home theatre audio since Dolby TrueHD and DTS-HD Master Audio. *Stephen Dawson*



Denon AVR-X4100W

\$2499

Firmware: 5325-1581-6062-05 **Power:** 7 x 125W (8 ohms 20-20 000kH:

Power: 7 x 125W (8 ohms, 20-20,000kHz, 0.05% THD. two channels driven)

Inputs: 8 x HDMI, 2 x component video, 0 x S-Video, 4 x composite video, 6 x analogue stereo, 1 x phono, 0 x 7.1 analogue, 2 x optical digital, 2 x coaxial digital, 1 x USB, 1 x Ethernet, WiFi, Bluetooth

Outputs: 2 x HDMI, 1 x component video, 0 x S-Video, 1 x composite video, 0 x analogue stereo, 1 x 13.2 pre-out, 11 pairs speaker binding posts, 1 x 6.5mm headphone

 $\begin{tabular}{ll} \textbf{Zone:} 1 \times \text{HDMI (dedicated), } 2 \times \text{analogue} \\ \text{stereo, } 1 \times \text{composite video, } 1 \times \text{component} \\ \text{video (assignable), assignable amplifiers} \\ \end{tabular}$

 $\begin{tabular}{ll} \textbf{Other:} 1 \times IR & in, 1 \times IR & out, 2 \times trigger, \\ 1 \times RS-232C, 1 \times Denon Link & HD, 1 \times setup mic \\ \end{tabular}$

Dimensions (whd): 434 x 167 x 379mm

Weight: 12.6kg Warranty: Three years Contact: QualiFi Pty Ltd Telephone: 1800 24 24 26 Web: www.qualifi.com.au





Yamaha Aventage RX-A3040

Thirty Years of Surround

Yamaha's top Aventage receiver shows how far home theatre has come since the company's first revolutionary surround product back in 1985.

Yamaha Aventage RX-A3040

AV receiver Price: \$2899

- + Extremely high performance
- + Full 7.1.4 Dolby Atmos support with additional amps, 5.1.4 or 7.1.2 without
- + Strong network and internet audio facilities
- Disappointingly limited support for low impedance loudspeakers
- Would prefer ability to manually set video deinterlacing

amaha is celebrating 30 years of surround sound this year — its DSP-1 Digital Soundfield Processor (see right) was launched back in 1985, with its analogue Dolby Surround decoder and 16 "sound fields" that simulated the ambience of concert halls and jazz clubs for two-channel material.

Thirty years on, the company remains at the forefront of home surround sound. Witness the 2015 Sound+Image award for AV Receiver of the Year over \$2000, our top receiver category, which went to this top-level Aventage receiver, which offers nine channels of amplification, and is ready for the game-changing formats of Dolby Atmos and the associated new Dolby Surround. It even still includes those soundfield modes for concert halls and jazz clubs, now all implemented for the 21st century through a snazzy-looking app. So here's the full review of this receiver, including our tips for tweaking the best possible performance from it.

Dolby Atmos changes the surround sound game by breaking the channel-

based soundtrack model. Rather than offering a specific number of channels in specific positions, the object-based instructions delivered for each discrete sound in a Dolby Atmos soundtrack are then processed by the receiver specifically for the channels available in your system. These can include the new ceiling speakers allowed for the "it's above you" effects in Dolby Atmos, and indeed, the specification supports up to 24.1.10 — that's 24 surround channels, one LFE channel and ten height channels (see p81).

No home theatre receiver supports that (yet!), but Yamaha's Aventage RX-A3040, though, provides the fullest realisation yet of these processes, supporting up to 7.1.4 channels — though for this you'll need to add an additional stereo amplifier. We reckon 7.1.4 is probably about as far as the mainstream is likely to go with surround sound for the next few years at least.

Equipment

It's very hard to think of anything that Yamaha has left out of the Aventage RX-A3040 in terms of features or



App control is a huge bonus given the complexity of AV receivers — no more peering across the room at the receiver display; enjoy all the information in clear and colourful touchscreen glory instead.

Back in 1985...

It was a 'Natural Sound Digital Sound Field Processor' offering "Real Sound Field Reproduction with YAMAHA's Advanced Digital Technology" — so the revolutionary DSP-1 announced itself when launched in 1985. It could synthesise up to six channels of sound from a stereo source, offering "16 Sound Effector Programs for your Personalized Sound Reproduction... with your own Parameter Settings Storing". One of these was Dolby Surround itself, for movies with actual encoding on them, but the bulk of the manual for the DSP-1 was devoted to explaining the 12 venue acoustics which Yamaha included to deliver music (or movies) with the real recorded acoustics of specific venues, while the 'Sound Effector' mode allowed echo, flange, chorus, stereo phasing, tremelo and even pitch change to be applied to the user's preference, though to be honest, we still have no idea why you'd want to do that...







performance, except for one limitation that has to do with its power amplifiers. It offers nine amplifier channels built in, each offering up to 150W of power into eight ohms at hi-fi specifications. The limitation is that only the front left and right channels are rated to support four-ohm loudspeaker loads. In the low impedance output mode all the other channels must offer at least six ohms. In the standard output mode, all speakers must be eight ohms. That restriction could rule out use of this receiver with many fine loudspeaker brands.

Everywhere else you look with this receiver, it's wall-to-wall quality and features. There are eight HDMI inputs,

with the front panel one supporting MHL. All support 4K video, and of course the receiver can upscale to as high as 4K if you want.

Most older connections are also provided, except for one change since last year, as Yamaha administers the final rites for S-Video. Other brands abandoned S-Video in previous years, but Yamaha doggedly maintained support, until now. S-Video can now RIP with the 5-pin DIN audio connection of the 1960s.

Networking is built in, as is Wi-Fi (2.4GHz band only). Bluetooth isn't, but included in the purchase price is Yamaha's Bluetooth adaptor, which

Speaker sockets

11 sets of speaker outputs for the nine channels of amplification, so you can have a couple of set-ups and switch between them.

Ins and outs

In addition to HDMI, Yamaha caters for legacy component and composite AV inputs, though for the first time S-Video has left the building!

нрмі

There are eight HDMI inputs, including one on the front panel which supports MHL. All HDMI sockets support 4K.



"With nine power amplifiers, the Yamaha can deliver either 5.1.4 or 7.1.2 **Dolby Atmos/** Surround on its own, or 7.1.4 with additional amps..."

Yamaha's Total Purity Concepti ncludes high-drive amp technology, high purity pre-amplification, anti-vibration technology and independent pure power supplies. **SYAMAHA**

As with any receiver at this elevated level, there is app control available. but also the physical

remote control for those who prefer something more tactile...



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***YAMAHA**

supports the aptX codec and connects to one of the receiver's coaxial digital audio inputs, powered by its 5V USB-style accessory power socket. Also provided is a phono input for turntables, while on the front panel there's a real USB socket and old-fashioned AV inputs.

With nine power amplifiers, the receiver can deliver either 5.1.4 or 7.1.2 Dolby Atmos/Surround on its own, but with the addition of two external channels of power, it can go to 7.1.4.

There are two other interesting divergences between this receiver and previous Atmos models we've looked at. First, your height speaker options aren't limited to either ceiling speakers above the seating area or Atmos-enabled speakers which bounce sound from the ceiling. You can also specify front presence or front and rear presence speakers. These are wall mounted, up high, at the front or front and back of the room and have been supported for years by Yamaha's own DSP modes. If you've already got a Yamaha system, you might already have these speakers installed. You can just leave them there. The Dolby Atmos/Surround processor will work out the signals to feed to them to produce the right effect.

The second difference is that while Yamaha has added the new Dolby Surround mode, it has not taken away the older ones. You can still select Dolby Pro Logic II or IIx or indeed, the original

Pro Logic. You can still experience the originally provided surround sound on older movies.

Incidentally, while Atmos only supports .1, this is a genuine .2 receiver. The LFE is mono, of course, but with regard to the bass redirected from the other channels, its two subwoofer outputs can be set as mono, to front and rear positions, or to left and right positions, localising the bass more closely to the places from which the upper frequencies emanate.

Performance

How deeply you want to calibrate this receiver is highly controllable by you. By default, you just screw the microphone onto a camera tripod, put it where your head would be and allow the auto calibration to run. That whips through in almost no time, the progress bar speeding to the end on your TV. But you can specify multiple position measurements — as common with Audyssey — and angle measurements, or both.

For the angles, you first run the main calibration, then you screw a three-armed boomerang (supplied with the receiver) to your stand, clip in its vertical arm and you effectively have a triangular pyramid. The tones are run through four times, and you put the measurement microphone at each apex as directed by the on-screen guide. For the receiver it's a simple matter of

triangulation. In addition to working out the angle to each speaker (except the centre channel, which is assumed to be at zero degrees, and the subwoofer), it calculates the height of what I'll call the height channels. They may be front and rear-wall mounted presence speakers. They may be Atmos-enabled speakers. Or they may be actual ceiling speakers. The last is what we used.

The point being that this receiver knows with greater precision where the speakers are than do most receivers. We would hope that this information is put to good use by the receiver to tweak the Dolby Atmos and Dolby Surround decoders to even greater accuracy, although we don't presume to know for certain that it does.

We always stress that you should check the results of an auto calibration; our system, for example, is often misinterpreted, particularly with regard to loudspeaker size. The Yamaha decided that every loudspeaker in our 5.1.4 system was 'Large'. We were, at this point, using the B&W CM Series 2 speaker system as the base 5.1 set-up. These are wonderfully competent loudspeakers, but expecting the surround and centre channel to carry deep, deep bass is asking too much. Our Jamo ceiling speakers, likewise, are first-class eightinch two-way models, but seriously... superdeep bass? No.

So after calibration we went into the manual speaker calibration section and set to small... well, everything! This receiver allows different bass crossover frequencies for each pair of loudspeakers, so we took the opportunity to set the front speakers' crossovers to 40Hz, and the crossover for all the others to 60Hz (we told you they are good speakers!). Interestingly, as we changed them all, we noticed that once we switched to 'Small' and the crossover selection menu came up, the receiver had pre-selected 40Hz for the front and surround speakers, and 60Hz for the others. It was as though the receiver had chosen back-up crossover settings, just in case.

Incidentally, the receiver correctly pegged our ceiling speakers as ceiling speakers, and not 'Atmos-enabled' or front and rear presence speakers. We're not sure if this is the default, or if the receiver deduced what they must be from the relative distances.

We shall confess to spending more time than usual in processed audio modes. We usually prefer our audio as originally recorded, but we're finding Atmos a lot of fun for movies and TV, and purity is not really such a requirement for them.

And certainly Atmos did its job with what was then our only Atmos disc — a demo Blu-ray from Dolby. There were raindrops striking something invisible above our heads, a whirling leaf falling through the air, its virtual position precisely defined, a dangerous-sounding insect darting this way and that above and to the rear of us.

With our broader range of non-Atmos 5.1 and 7.1-channel material, Dolby Surround did a very good job with quite a bit of it in filling in the acoustically dead area overhead. Quite a few Atmos movies have been made in the past couple of years, and with many their overhead material survives, ready to be extracted and put where it belongs by Dolby Surround. 'Edge of Tomorrow' — its sound delivered in decidedly non-Atmos DTS-HD Master Audio — had lots of exciting stuff above our heads. Likewise our present go-to disc, the rain on the car roof in Chapter 7 of the 1998 'Psycho' remake.

This receiver, with all nine channels running in 5.1.4 mode, powered these effects-laden movies to massive output levels rather effortlessly.

With stereo music, of course, we got rid of all this processing and went for the Pure Direct mode. We used CDs, SACDs and high resolution audio Blu-ray discs, plus we streamed high

resolution FLAC music from our server, with the receiver acting as the streamer, controlled by the excellent Yamaha AV iPhone/iPad and Android apps. The performance there was both sweet and powerful. The receiver also plays AAC, WMA, MP3, WAV and ALAC, but not DSD. We normally use a streamer that we chose primarily for the effectiveness of its control system. With this receiver we were perfectly happy to leave it out of the game entirely. The usability of the Yamaha control apps made it quite unnecessary.

You can also push audio streams via DLNA from various apps from Android devices, or via AirPlay from iOS devices and iTunes on computers connected to the same network.

There are internet services provided: Pandora, Spotify (including Spotify Connect — you'll need a paid subscription for Spotify) and internet radio. If you're not using Pure Direct, do make sure you switch off the 'Enhancer' when streaming, as it tended to make music sound fairly harsh. You need to change it for each network source individually.

The receiver can scale video up to 4K if you want. Unlike some of the models further down Yamaha's line-up, this receiver allows you to use its internal video processor without hampering its other capabilities. Its video processing options are limited to things like Colour and Brightness, which are best adjusted in the TV, and Detail Enhancement, which should never be used. The deinterlacing of 576i/50 and 1080i/50 material is all automatic. Yamaha's system was quite good at applying the appropriate film or video deinterlacing mode, but by no means perfect. We'd appreciate a manual override. We'd be inclined to choose a high-end Blu-ray player to spin discs, but we'd happily rely on the receiver's processing for output from our PVRs.

Because of the 'Scene' settings — four of which have dedicated keys on the remote — it's easy have some inputs process the video and others pass it through unaltered, since each Scene gathers both the input and all other settings together for one button push. The excellent GUI works either way, over the video in all resolutions, even 4K.

We were interested in seeing what changes the receiver makes in low impedance mode. Years ago when we checked this, we found that this mode reduced the rail voltage in the receiver so that the power output into four-ohm loads in this mode was roughly the same as it was into eight-ohm loads in the eight-ohm mode. With this

receiver that turned out not to be the case. Running just one front channel, in eight-ohm mode the receiver delivered a whopping 186W to an eight-ohm load before beginning to clip. That's 38.6V RMS. Powering a four-ohm load in the four-ohm mode, the receiver delivered a touch over 35V RMS, 307W of power.

One-channel measurements do not, of course, show overall performance. But it is nonetheless strong evidence that there's a mighty powerful beast lurking inside the Yamaha RX-A3040.

Conclusion

The Yamaha Aventage RX-A3040 is, we think, the most complete home theatre receiver we've ever seen. The only real disappointment is that four-ohm thing, and truth is we'd not let that hold us back, even if we were running four-ohm loudspeakers all around. We'd just exercise some discretion on output levels, and thereby preserve our hearing acuity for a little longer.

Perhaps the biggest surprise with this receiver is that it costs less than \$3000 for such class-leading abilities and performance. *Stephen Dawson*



Yamaha Aventage RX-A3040 \$2899

Tested with firmware: version 1.60

Power: 9 x 150W (8 ohms, 20-20,000kHz, 0.06% THD, two channels driven)

Inputs: 8 x HDMI (1 with MHL support), 3 x component video, 0 x S-Video, 5 x composite video, 9 x analogue stereo, 1 x phono, 1 x 7.1 analogue, 3 x optical digital, 3 x coaxial digital, 1 x USB, 1 x Ethernet, WiFi, Bluetooth (via included adaptor)

Outputs: 2 x HDMI, 1 x component video, 0 x S-Video, 2 x composite video, 1 x analogue stereo, 1 x 7.2 pre-out + Zone 2/3 line outputs redirectable to Front/Rear presence, 11 pairs speaker binding posts

 $\begin{tabular}{ll} \textbf{Zone:} 1x & HDMI (redirectable HDMI 2 output), \\ 2x & analogue stereo, 1x composite video \\ (redirectable from main output), \\ 1x & component video (redirectable from main output), assignable amplifiers \\ \end{tabular}$

Other: 2 x Remote In, 2 x Remote Out, 2 x Trigger, 1 x RS-232C, 1 x USB-style 5V power, 1 x calibration microphone

Dimensions (whd): 435 x 192 x 467mm

Weight: 18.1kg

Warranty: Four years (12 months

replacement)

Contact: Yamaha Music Australia

Telephone: 1300 739 411 **Web:** au.yamaha.com



Australia's number one guide to all things TV and hi-fi, from wireless speakers to headphones to soundbars and full-on surround sound — it's all in Sound+Image. You can swipe your way through every page on your iPad, Android tablet or computer using our snazzy Digital Issues (www.zinio.com/soundimage or Apple Newsstand or Google Play). But there's nothing like the proper print edition, landing in your letterbox sealed in cellophane, ready for you to read at your leisure...

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Dolby Atmos

It's above you! Surround sound has added a vertical dimension with the arrival of Dolby Atmos and rival object-based audio formats. But should you jump? And how high, asks Stephen Dawson, as he enters the Atmos dome of sound...



ow we've had a chance to use Dolby Atmos systems over several months, it's time to talk about what Dolby has been up to in adding more directions to surround.

Configurations

So far I've used Atmos-capable receivers from Denon, Yamaha and Onkyo. The precise number of channels has varied. The Denon AVR-X4100W supports 5.1.4 (see panel overleaf) with the addition of two power amplifiers, or 5.1.2 or 7.1.2. A lower cost Onkyo TX-NR636 was limited to 5.1.2 and has sufficient amps on board to support this. The Yamaha Aventage RX-A3040 could run to 5.1.4 without any additional amps, and to 7.1.4 if you add two power amps.

I went where possible with 5.1.4 (5.1.2 for the Onkyo), adding four two-way, 200/25mm Jamo ceiling speakers to my regular system and a pair of highpowered mono amps for the additional channels when using the Denon.

One other change was involved. Traditionally 5.1 sound has best been delivered with the surround speakers somewhat above ear level, typically a metre or so. A Dolby Atmos configuration prefers them (and surround back as well, if you're using them) at ear level.

Finally, actual Atmos content is rare. My thanks to Amber Technology for sharing a Dolby Atmos test Blu-ray; we also enjoyed the Atmos encoding on Teenage Mutant Ninja Turtles (see p90).

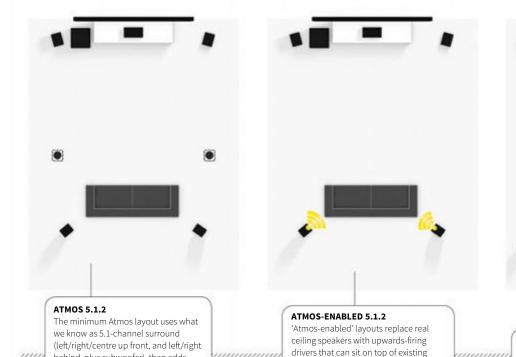
Atmos at work

Just as the first stereo LPs ping-ponged the sound from side to side, and early surround demos made aggressive use of all channels, so the Dolby Atmos demo disc is far from restrained. The assorted titles have sound elements whizzing hither and thither, with a great deal above the listeners' heads and indeed behind them. The disc demonstrated all this extremely well, with the positions of sounds of objects, even as they moved around, precisely located in space, or at least in direction. The two 5.1.4 systems had the edge over the 5.1.2 system, but even the latter was impressive.

Now in theory, if you were seated nice and central, a bullet could fly directly at your head. I think Atmos would accommodate that. But neither the tracks on this disc, nor any movie, is likely to deliver that kind of effect, because the surround has to be mixed for a group of people — a cinema-sized group in the first instance. If a bullet goes at my head when I'm in the middle, then for the person on my left it'll pull to the left (being seated nearer the left speakers), or to the right for people on my right. Further confusion could occur for anyone seated sufficiently to one side that they are under or beyond the ceiling speakers, because once to the left of the left ceiling speakers, all those theoretically left sounds will then come from the right.

To avoid any such issues, all sounds would seem to be designed to appear at





ATMOS 5.1.4
The usual 5.1-channel layout is augmented by four ceiling speakers around the listening positioning.

Box counting

If you understand what is meant by 5.1 and 7.1 channels, you'll have no problem understanding the extended soundfields of Dolby Atmos.

behind, plus subwoofer), then adds

a pair of full-range ceiling speakers,

But whereas 5.1 speakers are usually

situated above the listening positioning, Dolby Atmos will be more effective with these brought down to ear level.

indicated as \blacksquare on these plans.

So normal 5.1 has five channels (left/right/centre up front, and left/right behind) plus the 0.1 used to describe the subwoofer bass channel, often called LFE (low-frequency effects).

In Atmos you might add two ceiling speakers (5.1.2) or four ceiling speakers (5.1.4). Or you can start with 7.1 on the floor (left/right/centre, left/right surround and left/right rear, plus LFE), plus either two or four ceiling speakers to make 7.1.2 or 7.1.4.

There is one further complication, in that Atmos supports actual ceiling speakers or Atmos-enabled speakers, which sit perhaps on the top of your existing speakers and deliver the ceiling sound by bouncing the sound off your ceiling (reflective ceiling material is required!). The recommended positioning for Atmos speakers therefore also depends on the type of solution you're implementing. You can go even further than 7.1.4 if you have the space, with Dolby Atmos home configurations possible up 24.1.10 - 24 speakers on the floor and 10 overhead speakers, plus subwoofers. But you'll be needing rather more than the usual AV receiver to drive that lot...

or outside a certain perimeter that is roughly coincident with a misshapen half-dome that passes through all the speakers. If your left-side speakers are two metres to your left, then don't expect left-side sounds to seem any closer than about two metres. The rain in one of the Dolby demo-disc titles splashes above the listeners' heads, even though there's no indication of anything physical there to intercept it. In reality it would splash on the ground, but there are no loudspeakers down there to pull the sound down to that level, and even if there were it would be problematic from a left/right, front/ rear point of view, with a different experience for each person in the room.

surround speakers, bouncing their

It's a compromise, and we've heard

output off a necessarily reflective ceiling.

mixed reports about their likely success.

Those are compromises because of the nature of venues. All that said, my experiences with Dolby Atmos were a clear step up in encompassing surround. My real hope is that sound mixing engineers will take full advantage of it in movies.

Dolby Surround

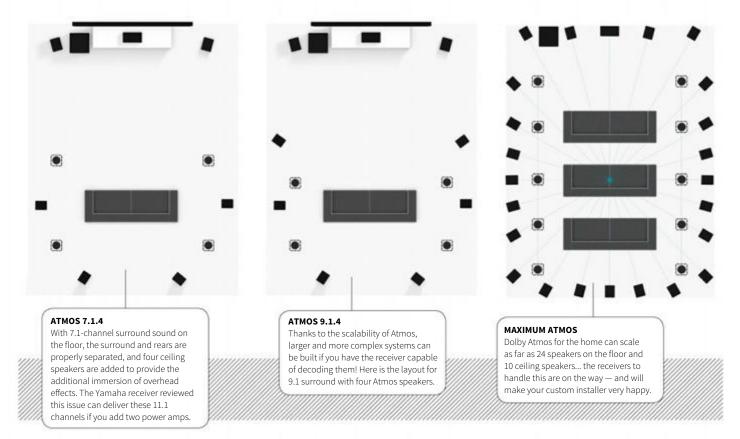
Of course, most of your material is not Dolby Atmos encoded. So when that's not in place, what do you do?

Previously there were all kinds of variants of Dolby Pro Logic from which you could choose: Dolby Pro Logic (the original-but-one, with centre and a mono limited-bandwidth surround); Dolby Pro Logic II (stereo full-range surround); Dolby Pro Logic IIx (adding rear surround) and Dolby Pro Logic IIz (with front height

channels). All of these, apart from the original Pro Logic, relied on the system deducing what content to put in the additional channels, and it seemed to me to that the returns diminished with each new system. After testing out IIz when it first became available, I decided it was pretty useless and never bothered again.

Dolby Atmos systems, though, have replaced all of these with just one 'process' mode: Dolby Surround. [Yamaha's implementation has retained all the old Dolby modes as well.] Of course, you can have direct unprocessed sound, but if you choose Dolby Surround while listening to two or multichannel material, the system will try to expand the soundfield to use all the speakers you have in your system, doing the job of all those processes that went before. And it does this far better, in my view, than IIz certainly managed, I'd guess because of the presence of real height speakers in your ceiling, not mere front height ones.

For example, I had Dolby Surround employed while watching Season 2 of the controversial British uber-conspiratorial TV show 'Utopia'. The visual and sound design of this show is astonishingly inventive, but all we get here in Australia is a low bit-rate two-channel version on SBS 2. As I was watching, someone walked up stairs, starting at the right-hand side of the picture. The stairs, if in my space, would have gone up and



towards the back of my room down the right-hand side. As she ascended, so did her footsteps. They did not come as far down the room towards the back as visually implied, but the sound certainly rose up to the ceiling in elevation (I replayed the section later, eyes closed, to check). Then the muffled footsteps of the person walking on the floor above were, again, clearly overhead. I have to say that I was extremely impressed.

For 5.1 sound I decided to see what Dolby Surround does with the rain in the 1998 Gus Van Sant remake of 'Psycho'. This should be pounding on the roof of the car as we pull into the Bates Motel.

I can report that Dolby Surround did that extremely well. The rain rattled on the roof of the car above my head, also striking the windows to the left and the right. All of it. It is entirely unambiguous. To be complete, I should note that it did not sound as though it was inches from my head, but a metre and a half away. There's that bubble again inside of which the 'source' of sound cannot venture. But that's barely a criticism given the effectiveness of what the system does.

How do they do it?

As I started trying to puzzle out how Dolby achieved this feat of determining, with astounding effectiveness, what should go overhead, it seemed like magic. Clearly there aren't clear cues in the audio itself. I acquired this DVD in 2002, long before this new version of Dolby Surround was a twinkle in the eye of anyone at Dolby. The 384kbps Dolby Digital 5.1 soundtrack certainly has nothing embedded to give assistance. The French, Italian and Spanish tracks are Dolby Digital 2.0 with a Dolby Pro Logic flag, and even with these Dolby Surround manages to separate out the distinctive rain-on-car sound and put it largely overhead, if not quite as cleanly. So how?

What kind of magic do they use?

Eventually the answer came to me (what follows is my best estimation of how it works — Dolby brushed off my questions by noting the technology was 'proprietary'). It is surprisingly simple in concept, although implementing it requires powerful engineering capabilities. Think of a 5.1 surround sound system, then imagine looking down on it from the top as though it were a plan view. Let us locate the elements of sound. The dialogue is coming from the centrechannel speaker. As someone walks across the stage, their footsteps move from left front to centre to right front. The sound of a door slamming behind you is coming from behind you. If you map these sound elements onto the plan, each will be located at or very close to the roughly circular perimeter drawn through the speakers.

Now consider one Psycho raindrop striking the roof of the car. It isn't on the perimeter. It is somewhere in the middle of the space. Dolby Surround can tell that it's in the middle of the space because the sound is being delivered not by one speaker, not by two adjacent speakers, but by five speakers to varying degrees. Where it is located — front/back, left/right — is determined by the relative strength of the signal from those five speakers.

But standard 5.1 surround has the same limitations as described above — it can't have the sound seeming to appear within the audience space, because then it will sound different to everyone. So it must sound as though it is coming from the surface or beyond of the imaginary bubble encompassing the audience. Dolby Surround can safely assume that all sounds towards the middle of the space should be up high.

So all it has to do is take each of those sound elements and lift them, using the ceiling speakers.

'All'. Hah! This is itself an engineering marvel. It must identify the matching sounds from all those channels, collating thousands of them, and separate them out from all the other sounds so that it can redirect them without damaging what's left to appear on ear-level perimeter.

For me Dolby Pro Logic IIz wasn't worth the bother. But both Dolby Atmos — and perhaps even more so Dolby Surround — are true advances in home theatre audio.

Stephen Dawson



or most of us in Australia, the concept of home cinema — having an experience comparable to visiting a commercial cinema at home — began back in the 1980s. While dyedin-the-wool film geeks had been able to rent movies on 16mm and even 8mm film for decades, it was the development of HiFi soundtracks on VHS and Betamax video players that really launched the home theatre industry. Suddenly, you could buy high-quality Dolby-encoded movies and the gear to decode and reproduce surround sound in your own home. For a realistic budget, you could have sound comparable

with any commercial cinema (and better than many) at home, whenever you liked.

From that time on, the imminent death of the commercial cinema was predicted by pundits far and wide. It didn't happen of course. At least, it hasn't yet. Early on, one of the many factors at play was picture quality — PAL VHS with its meagre low-definition picture wasn't nearly a match for a quality 35mm print on a commercial cinema screen.

But then the landscape changed again. It took a while, and was accompanied by much wailing and gnashing of teeth from die-hard celluloid enthusiasts, but

the commercial cinema switched from film to 'digital' projection. In 2005, the Digital Cinema Initiative established the 4K standard (actually 4096 by 2160 pixels) to comprehensively leap-frog the then-dominant 1920 x 1080 'full-HD' consumer format. Commercial cinemas were freed from the quality issues that plagued 35mm film prints as they aged — they could download new titles overnight instead of waiting for a print to arrive on a truck. Home cinema, by now onto DVD, couldn't match that!

Fast-forward another decade, and in 2015 home theatres are on the cusp of matching the commercial cinema pixel for



pixel. For a mere (!) \$10k or so, the Sony VPL-VW300ES 4K home cinema projector reviewed last issue offers the same SRXD display technology as Sony's commercial cinema projectors. Steven Dawson commented in his review that: "it's difficult to see how you could get a better home theatre performance". He's quite right. And once 4K movies become available to consumers online or on the promised 4K Blu-ray, it's difficult to see how you could get a better theatre experience full stop.

Things don't stand still, of course. Over the last decade we have seen 3D hailed as a saviour for cinemas, only to be matched almost immediately by home theatre... and then largely disappear.

Now the newest thing to shake up the cinema landscape is '4D'. Of course, it's not really "new", nor is it really a "thing".

4D OR NOT 4D

Unsurprisingly, the term '4D' doesn't have a precise definition. It has become a label applied to any 3D cinema experience that has extra audience effects added. We last investigated this topic five years ago when we traced the rich though chequered history of polysensual cinema entertainment. Over the years, Hollywood has experimented with a variety of such sensory experiences to add to the cinema's sight and sound. Charmingly titled technologies such as 'AromaRama' and 'Smell-O-Vision' brought us olfactory experiences,

while 'Percepto' and 'Sensurround' aimed at arousing the audience's sense of touch.

None of these lasted long in the mainstream industry. But a Korean company has used new technology to roll up a bundle of these extra "sensory effects" into a cinema product called 4DX. 4DX-equipped cinemas exhibit a variety of blockbuster movies that are "enhanced" by a variety of movement and "environmental" effects.

First of all, 4DX audiences are seated on "motion seats" that are equipped to roll, pitch and heave in response to on-screen action like car chases, aerial dogfights and more. But 4DX seats have a few more tricks as well, including air and water jets. During battle scenes you may feel a rush of air as you hear a bullet whizz past your ear. Should you go to sea, you'll feel the spray of water on your face. Depending where your on-screen journey takes you, technicians can trigger wind machines, strobe lighting to simulate lightning, fill the theatre with fog, or even let loose a cascade of bubbles. Finally, odours ranging from freshly brewed coffee to gunpowder or burnt rubber can be unleashed to "enhance" the experience even more.

It's fair to say that critical reviews of the 4DX experience have been mixed, pointing out that the extra environmental effects aren't actually programmed by the movie's makers but are added in by the 4DX company. However the cinema chain continues to grow, and last year the US trade paper Variety reported that the first 4DX Cinema in the US outperformed the average returns for conventional theatres showing the same movie. Cinemas are now open in 20 countries, though not, as yet, in Australia. (While there are a one or two specialty attractions locally that couple environmental effects with 3D movies, the nearest 4DX movie houses for the full experience are in Indonesia or The Philippines.)

So there is a question as to whether watching a 4DX-enhanced movie is more like a theme-park ride than a cinema experience. But if such extra sensory elements do become increasingly mainstream, can they also be incorporated as part of the home theatre experience?

Surprisingly, some are already here — and you can buy them in Australia. Canadian company D-BOX Technologies has devised a motion seat that offers synchronised movement to enhance the onscreen action. It is a more subtle ride than the 4DX experience, and it doesn't leave the audience dripping after the film, but its own 'shake, rattle and roll' effects have gained a following internationally. Like 4DX, the technology is installed in some commercial cinemas, but it is also available to purchase and install as part of your own

home cinema, either as individual seats or as a platform for a number of seats. We have seen a few of them in custom installations covered in the pages of *Sound+Image*; they are also popular to accompany gaming.

D-BOX soundtrack effects have been programmed "frame by frame" for more than a thousand movies, and there is now a rather clever method that allows a home theatre user to synchronise the chair's movement to the on-screen action. The motion codes for new movie titles are downloaded periodically from the internet under a subscription arrangement. The control box is connected to receive a stereo audio signal from the home theatre system, then compares the incoming soundtrack to its database and uses this to recognise the film being played. (The system may take half a minute to recognise a film the first time it is played, but this is reduced to a claimed six seconds on subsequent replay.) As the movie plays, the controller uses the soundtrack to keep the motion effects in sync, taking only a few seconds to re-sync after operations like fast forward, rewind or pause.

So if you want to add motion to your home motion-picture experience, D-BOX is ready to roll.

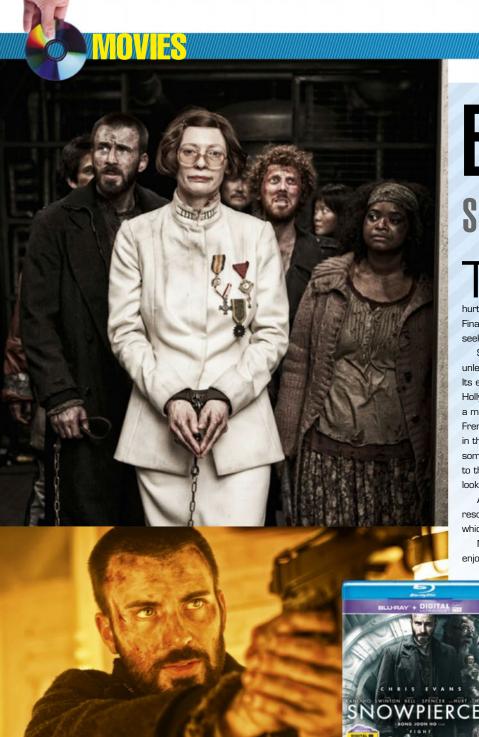
It seems that the further the cinema advances towards new immersive entertainment experiences, the faster the home cinema industry catches up in offering the same experiences — though perhaps thankfully (so far) without the more extreme theme-park style effects. I don't think I am quite ready yet to be periodically replenishing canisters of scent-oils, bubble mixture and fogger juice, or re-aligning wind machines and strobe lights in my media room... Derek Powell —



4DX: www.cj4dx.com

Sky News review of the first 4DX cinema in Britain: http://tinyurl.com/4dx-news

In Australia, D-BOX motion seating is available through Wavetrain Cinemas, which offered a robust rebuttal of the 4DX experience as "like a theme park ride, with big jerky movements... the exact way not to demo motion", whereas D-BOX, they say, "is about enhancing the sense of reality.": www.wavetrain.com.au



ENDS OF THE

SNOWPIERCER 2013

here are different ways of dealing with the end of the world. In 'Snowpiercer' it involves managing to survive
— just a few hundred of you — on a class-stratified train hurtling unendingly along sometimes snowed-in tracks. In 'These Final Days' it involves whimperingly running out on your lover and seeking an early oblivion in a party at the end of the world.

Snowpiercer is going to seem rather strange to you unless you've previously been exposed to Korean cinema. Its expressive language tends to be quite different to that of Hollywood. Not to say that this is full-blown Korean. It's more a merging of Korea and Hollywood, and is a take on a 1982 French graphic novel. We have a bunch of oppressed people in the tail of the train. They are periodically forced to surrender some of their children for reasons that are not made known to them. The children never return. The food they are supplied looks like blocks of aspic.

A moving train is most definitely an environment with resource constraints, so provoking the peasants into a revolt which leads to many being culled may, in fact, be policy.

Meanwhile, closer to the front of the train the overlords enjoy a sybaritic life. Think a small-scale Elysium on rails. Now,

after 17 years, this revolt threatens to succeed.

Things to watch for: the great Tilda Swinton as spokesperson for the powers that be, cluelessness and evil wrapped up in one package. Thing to wonder about: Jamie Bell was brought aboard as a baby. He would not have a British accent, but a 'train' accent. Things to enjoy: the constant, enveloping background noise of this new world, the subtle creaks and groans along with the constantly moving visuals of carriages in motion.

Just filming in the confined spaces — there are only a few shots from the outside — must have been a technical nightmare. Strangely the movie doesn't feel as claustrophic as you might expect. The action is bloody, and the outcome at times genuinely uncertain. All this is conveyed in

DISTRIBUTOR: Roadshow Entertainment

DIRECTOR: Joon-ho Bong

SNOWPIERCER

STARRING: Chris Evans, Kang-ho Song, Ed Harris, John Hurt, Tilda Swinton, Jamie Bell, Octavia Spencer, Ewen Bremner, Ah-sung Ko, Alison Pill

MOVIE: **** PICTURE: ****
SOUND: **** EXTRAS: ***

RUNNING TIME: 126 minutes

PICTURE: 1.78:1, 1080p/24, MPEG4 AVC @

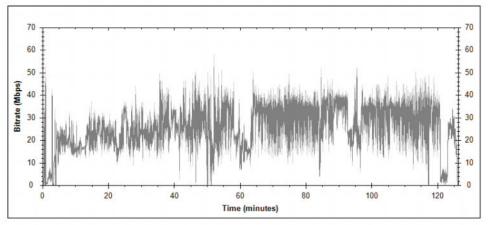
25.95Mbps

SOUND: English: DTS-HD Master Audio 16/48 3/2.1 @ 2859kbps (core: DTS 16/48 3/2.1 @ 1509kbps); English Audio Descriptive, Commentary: Dolby Digital 2/0.0 @ 224kbps

SUBTITLES: English

EXTRAS: Ultraviolet; 3 Featurettes (1080p/24 - 33 mins); Extended Animated Clip: 'Snowpiercer' (1080p/24 - 5 mins); Q&A (1080p/24 - 8 mins); Documentary (1080p/24 - 54 mins)

RESTRICTIONS: Rated MA, Locked to Region B



Video bit-rate for 'Snowpiercer' main feature

WORLD

THESE FINAL HOURS 2014

unimpeachable quality on this Blu-ray, with more than enough MPEG4 AVC bits tossed at the picture. The 2859kbps bitrate for the DTS-HD is rather high for 16-bit audio, evidencing the busyness of the soundtrack.

'These Final Hours' by contrast is a more personal movie. It's an emotional and physical journey in the last few hours before final world annihilation strikes Perth, 'On the Beach' style. Little explanation for this is given, other than a meteor has hit the North Atlantic, allowing Australia a 12-hour warning. James (Nathan Phillips) heads for "the party to end all parties", and along the way reluctantly finds himself the guardian of a young girl who has been separated from her family, comes across a variety of individuals, usual and ususual, attempts to make some final connection with his own family members, and joins a massive poolside party by a crowd apparently determined to see that no intoxicating substance is left unconsumed before doom strikes.

So it's a small movie — just 87 minutes — and personal, yet presented in big style with a 2.35:1 aspect ratio and full 24-bit sound. The sights around Perth are generally suburban and mundane, but interesting to an East-coaster,

and about as sunny as you can imagine. It certainly does not look like the last day of the world. The special effects, largely just a few distant fires, are ho-hum, but they're unimportant. Most scenes are deserted, as though the bulk of the population have left or are huddling indoors. All is captured with great clarity on this high bit-rate capture. The disc runs at precisely 24 frames per second rather than the more usual 23.976.

What a pity that the central character is so uninspirational. Even his final act was arguably all about him rather than his love. And with no special extras at all, there's no chance for an explanation outside the body of the film why this might be. +



70 70 60 60 50 50 40 30 30 20 10 0 40 60 80 Time (minutes)

Video bit-rate for 'These Final Hours' main feature

DIRECTOR: Zak Hilditch

STARRING: Jessica De Gouw, Sarah Snook, Nathan Phillips, Daniel Henshall, David Field, Angourie Rice, Kathryn Beck, Zaydah-lee, Lynette Curran

U-RAY REVIEWS

MOVIE: *** PICTURE: **** SOUND: **** EXTRAS: *

RUNNING TIME: 87 minutes

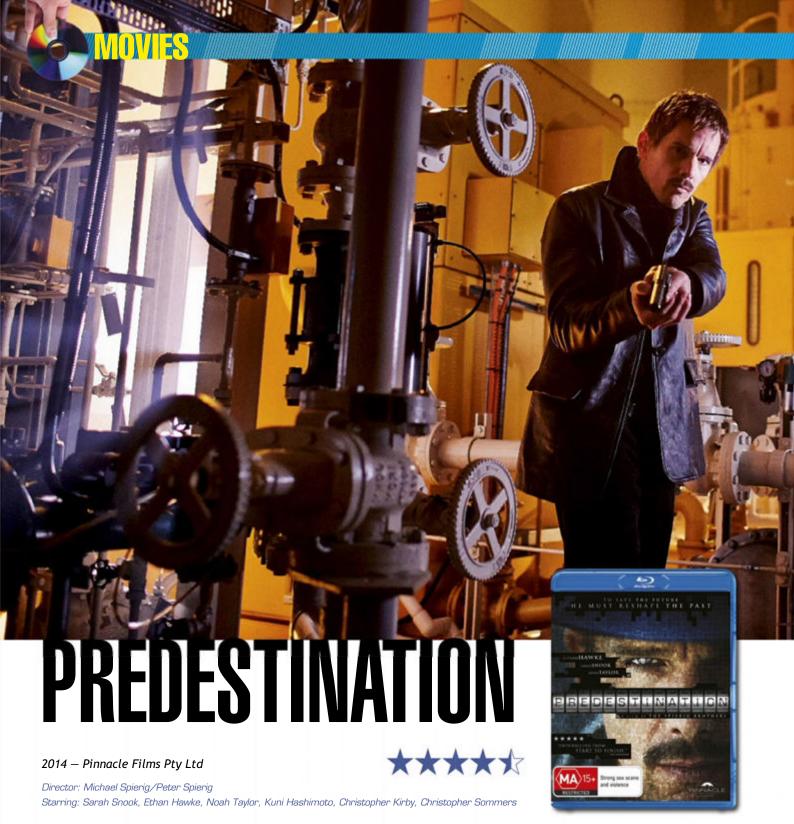
PICTURE: 2.35:1, 1080p/24*, MPEG4 AVC @

28.00Mbps

SOUND: English: DTS-HD Master Audio 24/48 3/2.1 @ 4116kbps (core: DTS 24/48 3/2.1 @ 1509kbps); English Audio Descriptive, Commentary: Dolby Digital 2/0.0 @ 224kbps

SUBTITLES: English **EXTRAS: Nil**

RESTRICTIONS: Rated MA, Locked to Region B



ack in 1950 Robert A Heinlein, the 'Dean of Science Fiction' as he was to become known, co-wrote 'Destination Moon'. That was the last time his work was properly treated by Hollywood. Until now.

There are dark rumours that the Body
Snatcher movies were lifted from Heinlein's
'The Puppet Masters'. As for the 1994 movie
called 'The Puppet Masters', anyone wanting to
understand the horrific sausage factory that is
Hollywood should read the story of how it was
made. Just Google 'terry rossio building the bomb'.
Rossio was one of the seven (!) scriptwriters.
Later, 1997's 'Starship Troopers' was actually

a satire on the novel for which it was named. And now we come to 'Predestination'. There are just two major changes from the original Heinlein story. The first is the name. The line is used in the movie, but the title of the 1959 story, '- All You Zombies -', was dropped. (Appropriately, since there are no zombies in this movie, nor in the story.) The other is the addition of a secondary plot. The story was only 12 paperback pages long, and even written in Heinlein's economical style, this isn't enough to sustain a 98-minute movie.

This is a time-travel story, and it is one of the two time-travel stories by which I've judged the integrity of every other time-travel story. In this

story, there is only one timeline. If you go back to 1932 and try to kill Hitler, you will fail. Not only that, a sufficiently detailed history would record you having failed. You cannot change the past because anything you did in the past is part of it already, even if it's a future version of you going back into the past to do it.

Since I have long known the story, I could watch the movie with approval of the way it presented Heinlein's vision. But I couldn't tell whether the revelations it makes would be surprising, so I watched it with two other people. Both were startled, astonished indeed, as they realised bit by bit who the various characters were.



This is an Australian film, and was clearly a labour of love for the Spiering brothers ('Daybreakers', 'Undead'), so it isn't really Hollywood. Chunks of the original dialogue are used. There are little things in there, like the focus on time (why is the bar scene the day before the day specified in the book?) and even the songs playing. There are hints — see the cigarette lighters used by The Barkeep and The Unmarried Mother. The other characters have real names, but the two main ones just get generic ones.

Presenting a story that is very internal, written in the first person, was a challenge, and there's

quite a bit of disguised exposition to get through before the action resumes (an action teaser is provided right at the start). I guess it was for that reason that the movie seems to have very limited distribution in the US, even though done American-style, with American voices and fake American locations (it was shot in Melbourne), and even though it stars Ethan Hawke, Surprisingly, it doesn't even seem to have been accompanied by a re-release of the original story (a book of Heinlein's more adult short stories, including 'By His Bootstraps', might go well under the title 'Predestination').

Still, it seems to have achieved quite the life on

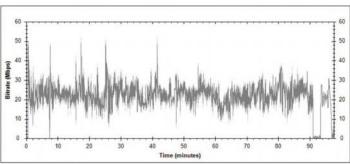
are 93,000 votes, with a mode (the neglected 'average') of 8, and ten per cent 10s (of which I am one!). Pinnacle Films has put it out on Blu-ray here, in addition to DVD. It's locked to Region B. And it is rated MA. Heinlein originally

1948, 1963, some time in the future and various other points in between. Some sections evoke film noire, while others are like the space station in '2001'. The opening overhead shot of man walking disc. On IMDB there through a tiled foyer is sparkling in its resolution. The photography services the story. The Blu-ray does a fine job servicing the cinematography. The sound is again solid, while not outstanding.

plus violence.

There is a decent surround mix and during action sections some impressive bass accompaniment. It does the job nicely without drawing attention to itself. Initially the extras appear rather slight, but

there is over an hour of interviews with the main players, including the directors and of course Sarah Snook, who manages to pull off an impossible role with considerable style. +



Video bit-rate for 'Predestination' main feature

PICTURE: ****

EXTRAS: ***

RESTRICTIONS: Rated MA, Locked to Region B

wrote the story for Playboy (which rejected it).

There isn't explicit sex, but there is brief male

On Blu-ray the picture quality ranges from

serviceable to startling, depending largely on the

cinematography. The movie is set in 1970, 1975,

nudity and some implied unconventional sex,



t's hard to imagine two more different TV shows from the 1980s.
Yet both were last year rebooted (yet again for one of them) as movies.
'Teenage Mutant Ninja Turtles' has transitioned from G and PG animation of the simplest kind to a kind of fun but surprisingly dark live action movie.
Likewise, the relatively limited action of the fine 1980s TV series
'The Equalizer' has turned into a brutal but stylish

Edward Woodward's Robert McCall was suave and wealthy, driving a Jag as befitted his British heritage. Denzel Washington's McCall seems to have had a much darker past, which he is leaving behind, apparently repenting by living a modest

TEENAGE MUTANT NINJA TURTLES

bloodfest in the 2014 movie.

DISTRIBUTOR: Paramount Home Entertainment (Australasia) Pty Ltd

DIRECTOR: Jonathan Liebesman

STARRING: Megan Fox, Will Arnett, William Fichtner, Alan Ritchson, Noel Fisher, Pete Ploszek, Johnny Knoxville, Jeremy Howard, Danny Woodburn, Tony Shalhoub, Tohoru Masamune, Whoopi Goldberg

MOVIE: ***

PICTURE: ***

SOUND: ***

EXTRAS: ***

RUNNING TIME: 101 minutes

PICTURE: 2.35:1, 1080p/24, MPEG4 AVC @

28.01Mbps

SOUND: English: Dolby TrueHD Atmos 24/48 3/4.1 @ 5544kbps (embedded: Dolby Digital 3/2.1 @ 640kbps); German, Spanish, French, Hindi, Italian, English Audio Descriptive: Dolby Digital 3/2.1 @ 640kbps

SUBTITLES: English + 11 others

FEATURES: Extended Ending (1080p/24 - 1 min); 6 Featurettes 1080p/24 - 51 mins); 3D Featurette (1080p/24 - 4 mins); Music Video (1080p/24 - 3 mins)

RESTRICTIONS: Rated M, Region Free

life with a modest job while helping people. But not through violence. Just friendship and support.

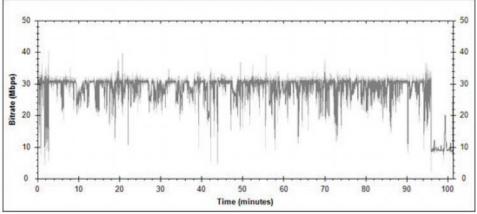
Until, of course, Chloë Grace Moretz — a prostitute controlled by the Russian mob — needs his help. It turns out that behind his smile lurks a killing machine. The action was solid, and I particularly enjoyed the positive view that

the movie took of the attitude and aspirations of the characters who worked in a barely disguised 'Home Depot'.

As the years have passed, wildly stupid gun errors have diminished in movies. No longer do you see someone fire 13 rounds from a six shooter, as John Wayne did in 'The Sons of Katie Elder'. Still, some remain. At 1:21:26 there's a sequence of 15 frames, when a corrupt cop checks his six-shot revolver to ensure that it's properly loaded and it kind of stuck out that all six rounds had actually been discharged. Hint: a dimple in the primer means that it has been hit by a firing pin. That's Blu-ray for you: it shows far too much.

After some interesting experimentation in the early years of Blu-ray, features have become rather bland: principally featurettes, the occasional commentary. On this one they've at least tried. You get five featurettes, but also a version of the





Video bit-rate for 'TMNT' main feature

TEENAGE MUTANT NINJA TURTLES 2013 THE EQUALIZER 2014

movie in 'Vengeance Mode', seamlessly branching at relevant points to nine featurettes explaining some aspect of the movie. These amount to an additional 23 minutes of material.

This is a demo-quality movie when it comes to surround, with lots of specific items around back and sides, well defined and often panning around. The sound engineer had fun here.

As for TMNT, I'm not ashamed to say that I rather enjoyed it. It's a silly fantasy of course, but the CGI renders the Renaissance foursome remarkably realistically. Megan Fox is pretty and cartoonishly silly and smart, swinging from one to the other moment by moment. A suitable back story tying everyone together is provided. An end-of-the-world plot must be averted by the lumpy lads, all while trying to hide their identity and deal with their sometimes fractious interpersonal relationships. And there's a great sequence where everyone — including a massive truck is sliding and tumbling down a snowy slope, still fighting, and it goes on way, way, way too hilariously long. There are a couple of genuinely tense scenes, including a touch of torture, that ensures the movie is M rather than PG.

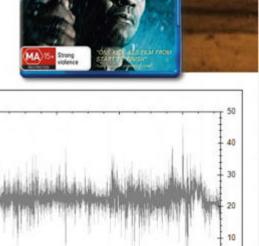
But the main reason I've included this is that this was the first movie to hit Australia with Dolby Atmos encoding; it says so on the

pack, and the relevant indicator was shown by the AV receiver. And there was no doubt about it: the dense sound mix had stuff happening everywhere, especially during the action scenes, and including up high. It isn't going to be a demo disc, though, because nothing stays still long enough for you to point at it.

And perhaps this is more important: I've been watching a lot of movies on an Atmos-capable home theatre receiver with Dolby Surround selected. This extracts height information from the 5.1 or 7.1 mixes and sends it up high as well. And truth be told, there's not a whole lot of difference

At least, not with movies where everything's happening everywhere all the time...

40



Time (minutes) Video bit-rate for 'The Equalizer' main feature

THE EQUALIZER **** **DISTRIBUTOR:** Roadshow Entertainment DIRECTOR: Antoine Fuqua STARRING: Denzel Washington, Marton Csokas, Chloë Grace Moretz, David Harbour, Haley Bennett, Bill Pullman, Melissa Leo, David Meunier, Johnny Skourtis, Alex Veadov, Vladimir Kulich PICTURE: **** MOVIE: ****

SOUND: ***** EXTRAS: ***

RUNNING TIME: 101 minutes

PICTURE: 2.35:1, 1080p/24, MPEG4 AVC @

22.85Mbps

SOUND: English: DTS-HD Master Audio 16/48 3/2.1 @ 2713kbps (core: DTS 16/48 3/2.1 @ 1509kbps); English: Dolby Digital 3/2.1 @

SUBTITLES: English, English for the Hearing Impaired

FEATURES: Ultraviolet copy; 5 Featurettes (1080p/24 - 34 mins); Spoof trailer (1080p/24 - 2 mins); Vengeance Mode - movie with branching to 9 additional featurettes (23 mins extra); 52 photos (1080p/24, MPEG2, Silent) RESTRICTIONS: Rated MA, Locked to Region B

LOUDSPEAKERS

Our new Sound+Image buying guide is based on the Awards we present each year. We've listed all still-available products, but we'll be varying the featured categories each issue, starting with speakers, PVRs, amps, headphones, DACs and soundbars.

Loudspeakers

Kyron Audio's Kronos design

Every model listed here has won a Sound+Image award – they represent the height of loudspeaker design and each offers top-value performance at its price, whether low or high! Different finishes can change the pricing, so check with your dealer or the manufacturers' website for more details.

Make and model					
Usher Audio S-520	\$490	HC 2013	Yes	www.westan.com.au	A longstanding high-quality design alone or with a subwoofer. Price varies with finish.
Xavian Bonbonus	\$499	HC 2014	Yes	www.finallink.com.au	The first 'low-cost' Xavian is a great success – a solid small package with plenty of colour options!
Focal Chorus 706	\$899	HC 2015	Yes	www.nadist.com.au	Classic cabinet design (gorgeous walnut veneer) yields superb imaging and highs, glorious mids.
Q Acoustics Concept 20	\$929	HC 2015		www.westan.com.au	Amazing results from usefully compact standmounters; their optional matching stands are \$729.
B&W 685 S2	\$999	W 2015	Yes	www.convoy.com.au	Hugely engaging and musical, they performed above many speakers at double the price.
Krix Acoustix Mk2	\$1,195	W 2015	77-000	www.krix.com.au	Three-driver two-way standmounts that sound like floorstanders with outstanding soundstaging.
GoldenEar Technology Aon 3	\$1,645	HC 2014	Yes	www.kedcorp.com.au	Strangely-shaped standmounters combining active and passive drivers to great effect.
Krix Phoenix mk2	\$1,795	W 2014	Yes	www.krix.com.au	Usefully small floorstanders with a really big sound, amazingly lucid and highly accurate.
Krix Epix	\$1,995	W 2015		www.krix.com.au	In-wall speakers (the price is per speaker) we are happy to recommend, based on Krix's Neuphonix.
Orpheus Apollo VI	\$2,000	HC 2012	Yes	www.orpheusaudio.com.au	Beautifully crafted, delivering fast and tight bass, smooth midrange and extended treble.
KEF LS 50	\$2,299	W 2013	Yes	www.advanceaudio.com.au	Inspired by the classic LS3/5A, exemplary build and superb sonics combine in this superb speaker.
Whatmough P28-SE	\$2,699	W 2012		www.whatmoughaudio.com.au	The DNA of the P33i but at high value, floorstanders a class above their price (which varies with finish)
Equinox Eclipse	\$2,900	HC 2013	Yes	www.equinoxaudio.com.au	The handcrafted Eclipse sounds ultrasmooth and uncoloured, with extended highs and natural lows.
Sonus faber Venere 2.5	\$3,799	HC 2014		www.synergyaudio.com	Italian design with Chinese build allows great value and exciting presentation from these stunners.
Aaron HMF-600MkII	\$4,499	HC 2011	Yes	www.aaronhifi.com.au	Hume L'Estrange's Hyperboloid marvels in MkII form, deep extended bass, superb mids and highs.
Atlantic Technology AT-1	\$5,500	HC 2012	Yes	www.networkav.com.au	H-PAS technology for powerful bass, extended highs plus an articule midrange – great speakers.
Jamo C 109	\$5,690	HC 2015		www.qualifi.com.au	The flagship of the new Concert Series from now Klipsch-owned Jamo, exciting and highly dynamic.
Yamaha Soavo NS-F901	\$5,999	W 2015		au.yamaha.com	Glossed like their pianos and equally musical, the Soavos sound realistic, detailed and musical.
JBL 4429 Studio Monitor	\$7,999	HC 2013	Yes	www.convoy.com.au	Stunning studio-style sound with power and dynamics – one of our longterm reference designs.
Sonance Landscape Series	\$8,000	W 2012		www.ambertech.com.au	Outdoor garden speakers with clever sub-sat system for even coverage. Price varies with set-up.
Whatmough P33i Signature	\$9,500	HC 2012		www.whatmoughaudio.com.au	Slim but tall, surprisingly heavy, and superbly balanced performance. Price varies with finish.
Sony SS-NA2ES	\$9,999	W 2014	Yes	www.sony.com.au	Sony surprised many by taking our top award in 2014 for these sophisticated, sweet floorstanders.
MartinLogan Ethos	\$9,999	W 2012	Yes	www.audioactive.com.au	Effortless electrostatic sound supported by conventional bass drivers. Lovely; sound the gong.
Audio Physic Virgo 25 plus+	\$19,400	HC 2015		www.radianceav.com.au	An outstanding 25th anniversary design, tonally accurate and detailed. Price varies with finish.
Vivid Audio B1	\$19,900	HC 2013	Yes	www.avation.com.au	One-piece with integral stand, the B1 is artwork and speaker combined, expertly voiced and refined.
B&W 802 Diamond	\$21,000	W 2013	Yes	www.convoy.com.au	Magnificent – the Abbey Road reference speakers are an utterly musical and thrillingly smooth listen.
Whatmough Signature Progeny	\$28,000	HC 2015		www.whatmoughaudio.com.au	Descendent of Australian Whatmough's ultimate Paragon, revelatory resolution and huge delivery.
Dynaudio Confidence C4	\$31,999	HC 2011	Yes	www.dynaudio.com/au	Immaculate build, gorgeous design, superb sound commensurate with their high-end aspirations.
Vivid Audio GIYA G3	\$45,000	W 2014		www.avation.com.au	We gave a special Judges' Choice award for Laurence Dickie's sonic sculptures, a genuine classic.
Wilson Audio Sasha Series-2	\$51,795	HC 2015		www.advanceaudio.com.au	Profound frequency-wide dynamic impact with an immersive soundfield, Wilson improves a classic.
Wilson Audio Alexia	\$79,295	W 2014	Yes	www.advanceaudio.com.au	Positively heroic construction and mystery compounds, delivering music beyond all expectations.
Kyron Audio Kronos	\$82,225	W 2015		www.kyron.com.au	Our speakers of the year, winners of Best Sound in Show – world-class Australian system speakers.
TAD Reference One	\$88,000	HC 2014		www.pioneer.com.au	TAD is Pioneer's 'Formula 1 racing division', and their Reference Series flagships did not disappoint.



Made for sharing



Topfield's Android Smart PVR is made for sharing. Loaded with full PVR abilities as a twin-tuner TV recorder with 500GB hard-drive, the TF-T6211HDPVR can also share those recordings (or a live TV stream) with multiple smartphones or tablets on your home network.

In the other direction you can stream content from your smartphone or tablet to the Topfield and watch it large on your TV.

As for content, the Android platform allows downloading of hundreds of apps for catch-up TV, video, music, social media, games and more.

- Enjoy smart TV even if you don't have a smart TV!
- Twin-tuner 500GB PVR (record two channels, watch a third)
- Watch from your smartphone or tablet
 Stream smartphone & network content to your TV
- Android Apps (runs Android 4.2 Jelly Bean)
- Control all the Android smart apps with your smart Air Mouse!





PERSONAL VIDEO RECORDERS / AMPLIFIERS

PVRs

Humax 4tune 'Home Entertainment Server'

The latest personal video recorders are adding additional tuners, so you can record more shows at once, plus extensive media abilities including network sharing and playback to tablets via home Wi-Fi. Many have varying prices depending on the size of hard drive.



Make and model					
Panasonic DMR-HW220	\$399	W 2013		www.panasonic.com.au	Also HC in 2014, so good we awarded it twice! Twin-tuner PVR with 1TB hard drive, Wi-Fi and DLNA.
Humax HD7500T	from \$399	W 2012	Yes	www.humaxdigital.com/au	\$399 for 500GB, \$499 for 1TB – a twin-tuner PVR with great UI, networking and media playback.
Humax HDR-7510T	from \$409	W 2014		www.humaxdigital.com/au	\$409 for 500GB), \$509 for 1TB – twin record, watch a third, great UI, networking and Humax apps.
Topfield TRF-7160	\$435	HC 2012		www.topfield.com.au	Twin tuners (four-channel record), 500GB drive and media playback at a useful price level.
Topfield TRF-2460 Masterpiece HD Plus	\$559	HC 2011		www.topfield.com.au	Longstanding PVR powerhouse – twin tuners (four-channel record), 1TB drive and media playback.
Beyonwiz T3	from \$599	HC 2015	Yes	www.beyonwiz.com.au	Great 3-tuner PVR; price shown is for 500GB, also 1-4TB versions available at higher cost.
Humax 4tune	\$649	W 2015	Yes	www.humaxdigital.com/au	$Four tuners, extensive \ media\ capabilities\ including\ iPad\ playback\ and\ FreeviewPlus\ compatibility.$
Strong SRT 7000	\$499*	HC 2013	Yes	www.strong.com.au	*Now re-released as the SRT 7014, a twin-tuner 500GB PVR with plenty of smart functionality.

Amplifiers

At its core a perfect amplifier should be simply 'a straight wire with gain', amplifying the signal without changing its characteristics. But amp performance is as varied as any other component — don't get hung up on watts, think quality as well as quantity...



Make and model	Price	Award	AVHu	b Website	
Marantz PM5005 integrated	\$590	W 2015		www.marantz.com.au	Our current entry-level award-winner, superb for the price and fully featured.
NAD D 3020 integrated	\$749	HC 2015	Yes	www.nad.com.au	Reinvented for the digital age, NAD's classic '3020' integrated gets a neat and still sound-first design
Creek Evolution 50A integrated	\$1,650	W 2014	Yes	www.epoz.com.au	Modular design, all-electronic controls, steady high-quality output power in a slim attractive chassis
Bel Canto REF150s power amps	\$2,500	HC 2011	Yes	http://absolutehiend.com	Class D power in a compact power amp with an amazing lightness of touch.
Aaron XX integrated	\$3,299	HC 2013	Yes	www.aaronhifi.com.au	Faultless construction and impressive authority from this German marque's anniversary product.
Unison Research Simply Italy integrated	\$3,399	HC 2014	Yes	www.radianceav.com.au	Impeccable build, Italian flair and superb sound, as well as glowing valves to tempt you
PrimaLuna ProLogue Premium Preamplifier / Stereo Power Amplifier	\$5,998	HC 2012		www.interdyn.com.au	Pricing is \$2,499 / \$3,499 for pre and power respectively, a feast of valve design using EL34s or KT88s
Bryston B135 SST2 integrated	\$5,999	HC 2014	Yes	www.bryston.com.au	State-of-the-art high-power low-noise Canadian amplification – DAC and phono stages are options
Manley Labs Stingray iTube integrated	\$8,295	HC 2011	Yes	www.krispyaudio.com.au	Retro-styled pure valve integrated – sweet treble, fluid midrange, and an iPhone dock
Marantz PM-11S3	\$8,490	HC 2015		www.marantz.com.au	Exemplary facilities and construction matched by clean, clear and powerful sound.
VTL MB-125 monoblock power amp	\$8,995 pair	HC 2015	Yes	www.advanceaudio.com.au	Sweet yet hard-driving valve power amps, they proved speaker-friendly as well as sonic beauties.
Yamaha A-S3000 integrated	\$8,999	W 2014	Yes	au.yamaha.com	All the stops were pulled for this superb piece of engineering with huge power and 10-year warranty
Devialet 200 integrated	\$10,500	W 2015	Yes	www.avation.com.au	Unique technology, form and functionality from this French company that's out to reinvent audio.
Gryphon Atilla integrated	\$13,195	W 2011		www.kedcorp.com.au	Linear power supply and output stage; stunning immediacy and clarity in a striking case.
Moon 700i	\$14,595	HC 2012	Yes	www.e-e.com.au	Built like a tank, comprehensibly connectable and delivering 175W from its dual-mono design.
Dan D'Agostino Master Systems Momentum Monoblock power amps	\$75,195 pair	W 2013		www.advanceaudio.com.au	Dan D'Agostino's first product post-Krell – a stunner to look at, a thrill to hear.
Gryphon Mephisto Stereo power amp	\$83,395	HC 2013	Yes	www.kedcorp.com.au	A massive Class-A stereo power amp from Danish high-end company Gryphon.
Musical Fidelity M3i integrated	\$1,595*	HC 2012		www.audiomarketing.com.au	*Now updated in a new M3si guise with more inputs and increased power
Marantz PM-KI-Pearl-Lite integrated	\$2,290*	W 2013	Yes	www.marantz.com.au	*Recent model – the 'Lite' version of the Pearl, but its performance is anything but light







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10 REASONS TOBUY HI-FIATA HI-FI SHOP

YOUR LOCAL HI-FI SHOP IS PASSIONATE ABOUT SOUND. WHY RISK YOUR MUSIC WITH ANYONE ELSE?

THE HI-FI SHOP

Talk to people with years or decades of hi-fi knowledge

Receive reliable personal advice

Expect to be asked about your needs and music

Listen in a room environment before you buy

Have a nice coffee

Purchase with pride

Get a full warranty with local return point

After-sales service

Have an ongoing relationship

Relax and enjoy fine music

THE CHAIN STORE

Talk to people with days or even weeks of hi-fi knowledge

Bit of a lottery on the advice front

Expect to be asked about your budget

Listen over a noisy shop floor if you can listen at all

There's a coffee shop three doors down in the Mall, mate

Purchase in ignorance

Be offered an extended warranty you probably don't need

After-sales what?

Rarely the same staff twice

Relax and enjoy your mass-market bargain

THE INTERNET

No people

No advice

No filtering questions

No listening

Make your own

Purchase with fear

Warranty possibly void in Australia

After-sales what?

No contact with staff

Purchase and pray

HAPPY SCALE

UNHAPPY SCALE







HEADPHONES / DACs

Headphones

Bose QuietComfort 25 noise-cancelling headphones

For private audio at home and for that essential soundtrack to your life outside, the best headphones can improve your whole musical experience. At Sound+Image we review mainly on-ear and over-ear designs, looking for well-balanced sonic value at any price.



Make and model					
Panasonic RP-HTX7 over-ear	\$70	HC 2013		www.panasonic.com.au	Retro overears, well balanced with plenty of detail as well as upper bass. Bargain alert!
Yamaha HPH-M82 on-ear	\$100	HC 2015		au.yamaha.com	Strange but well-constructed design with a gentle beguiling sound and great comfort.
Thinksound ts02+mic in-ear	\$149	W 2012, HC 2013	Yes	www.noisymotel.com	Our favourite in-ears at anything like this price – warm and revealing sound with great bass.
Koss Tony Bennett Signature Edition	\$199	HC 2013		www.koss.com	Don't be put off by the signature! These are great-sounding headphones
Harman Kardon BT over-ear	\$370	W 2014	Yes	www.convoy.com.au	Bluetooth wireless headphones that feel luxurious and sound great
Bose QuietComfort 25 over-ear NC	\$399	W 2015		www.bose.com.au	Active with noise cancelling, passive without – these are Bose's best over-ear designs yet.
Bose QuietComfort 20i in-ear NC	\$399	W 2014		www.bose.com.au	Incredibly successful in-ear noise-cancellers with an inline lozenge for the electronics.
Sennheiser RS 170 wireless	\$450	W 2011	Yes	www.sennheiser.com.au	A new wireless range is on the way, but Sennheiser's original cordless models were fine indeed.
Sennheiser Momentum over-ear	\$450	HC 2014		www.sennheiser.com.au	Glorious upper mids and smooth treble delivered with high style by the headphone meisters.
KEF M500 over-ear	\$459	HC 2014	Yes	www.advanceaudio.com.au	Gorgeous on-ear 'executive' phones with hinging bands, natural treble and wide open treble.
PSB M4U 2 over-ear NC	\$499	W 2013, HC 2015	Yes	www.qualifi.com.au	Use their power for noise cancelling or the stunning active mode. Large but utterly wonderful.
AKG K495 NC over-ear NC	\$499	HC 2014	Yes	www.qualifi.com.au	Excellent noise cancelling, beautiful over-ear design and delicious hi-fi sound.
Sennheiser HD8 DJ over-ear	\$500	W 2015	Yes	www.sennheiser.com.au	Flat and powerful for mixing, and no slouches on the commute (though the cables are long!).
Sennheiser IE 80 in-ear	\$600	W 2013		www.sennheiser.com.au	Impressively natural in-ears with tunable bass response; impressively calm under pressure.
Oppo PM-1 over-ear	\$1,699	W 2015	2,0.00	www.oppo.com.au	Planar-magnetic sophistication given their best by Oppo's matching HA-1 headphone amp.
Sennheiser HD 800 over-ear	\$1,700	W 2012		www.sennheiser.com.au	A long-term reference for us for their thrillingly airy and articulate purity of presentation.

DACS

Musical Fidelity M1SDAC

The digital-to-analogue converter is back as a hi-fi essential mainly for users of computer audio, who need a good USB DAC to convert files into analogue output for a hi-fi system. But they can also upgrade any digital source, and many provide good headphone amps too.



Make and model					
AudioQuest DragonFly 1.2	\$199	HC 2015		www.ambertech.com.au	Sexy little DAC in a USB stick for high-quality headphone listening from a laptop.
Cambridge Audio DacMagic XS	\$229	W 2015		www.synergyaudio.com	Another small USB DAC for portable use – we'd pick this for sound over the Dragonfly. Just.
Arcam rPAC DAC	\$299	HC 2013	Yes	www.arcam.com.au	Larger but still powered from USB, great sound and also line-level out for home use.
Arcam rBlink DAC	\$349	HC 2014		www.arcam.com.au	Stream Bluetooth into this DAC and on to your hi-fi – great sound, AAC and aptX included.
Denon DA-300USB	\$849	HC 2015		www.au.denon.com	Neat USB/optical/electrical DAC and headphone amp up to 192kHz and including DSD.
Musical Fidelity M1SDAC	\$1,295	W 2015		www.audiomarketing.com.au	Plenty of inputs, including Bluetooth, and a very special sound at the price. We love this DAC.
NAD M51 DAC	\$1,899	W 2014	Yes	www.nad.com.au	Up to six inputs including HDMI, and superb music conversion from this full-size DAC.
Bel Canto C5i DAC/amp	\$2,990	HC 2012	Yes	http://absolutehiend.com	Actually a DAC and amplifier, just add digital source and speakers for very high-quality results.
Musical Fidelity M6DAC	\$3,495	HC 2014	Yes	www.audiomarketing.com.au	The first time we heard Bluetooth sounding brilliant was here; USB and SPDIF also onboard.
Bricasti Design M1	\$10,900	W 2014	Yes	www.zensatiaustralia.com	So resolving, so 'correct', so musical that it can make digital converts of analogue fans.
Trinity DAC	\$59,000	W 2015		www.zensatiaustralia.com	If we had to bin every DAC bar one, Trinity's unique DAC would be the sole survivor
Bricasti Design M1 Trinity DAC			Yes		







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WIRELESS SPEAKERS / SOUNDBARS & BASES

Wireless speakers

HEOS 5, the middle size of HEOS wireless multiroom speakers

*Pioneer's first release of wireless speakers were plain but offered good sound for the price

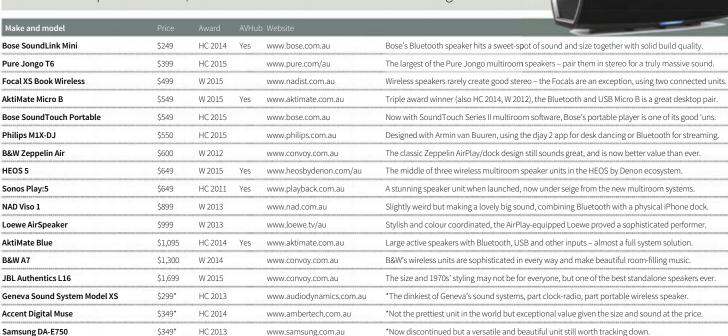
*Now updated with Bluetooth and retaining our recommendation for its superb performance.

*We loved the sound quality of these original Xeos, now coming in a new "revolutionary" form!

*A lovely gloss-finished tabletop speaker with Bluetooth streaming and DAB+/FM radio

Yamaha SRT-1000 sound base

One of the most active categories of recent years, wireless speakers can use Bluetooth, AirPlay or DLNA, or can even form part of a coordinated multiroom system (like those reviewed in-depth in this issue). All the models below have won Sound+Image Awards.



www.powermove.com.au

www.aktimate.com.au

www.dvnaudio.com/au

www.audiodynamics.com.au

Soundbars and bases

\$499*

\$699

\$795

HC 2013

W 2011

HC 2013

HC 2013

Pioneer XW-SMA3

Geneva S DAB+

AktiMate Mini+

Dynaudio Xeo 3

Soundbars sit in front of your TV, sound bases sit underneath your TV. They're no replacement for decent stereo or surround speakers, but the best of them do a good job improving the thin sound that comes from today's flatpanel TVs.









PHANTOM BY DEVIALET is like nothing that has come before it.

A wireless music system combining Devialet's unique world-acclaimed hybrid amplification introduced in products like the Devialet 200, with entirely new concepts in speaker implementation.



The Phantom's digital inputs let you rediscover the high fidelity music available on your smartphone, tablet or computer. Enjoy a single Phantom, twin Phantoms in stereo, or multiple Phantoms linked through your home via Wi-Fi, Ethernet or powerline networking.

Devialet's world-class electronics have changed the face of audio. Now the Devialet Phantom takes things to a new level. **Alone, or with friends – let there be happiness.**



